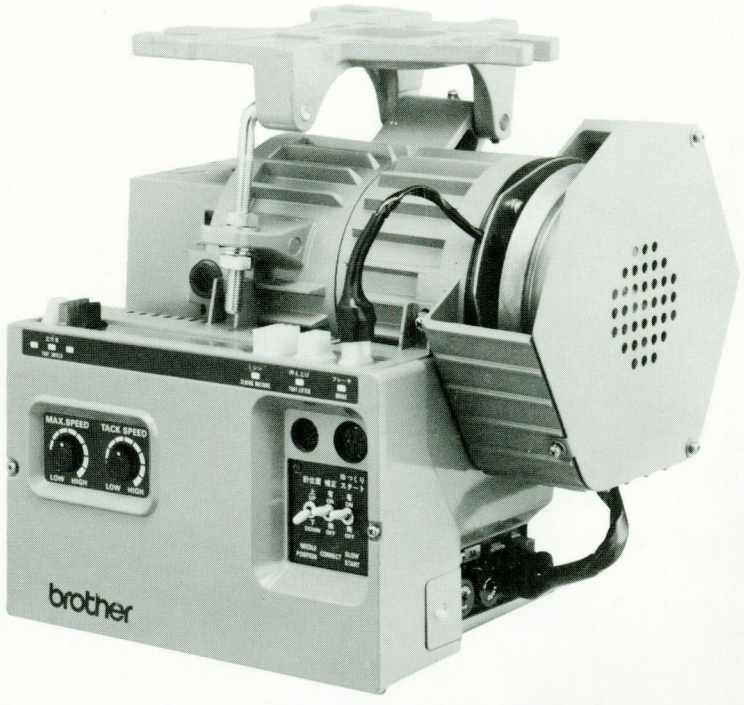
brother

DC MOTOR SERVICE MANUAL

MD-802 (Single-Phase Type)
MD-812 (Three-Phase Type)



BROTHER INDUSTRIES, LTD.
NAGOYA, JAPAN

INTRODUCTION

This service manual is compiled for the technical staff who maintain and inspect the drive motor designed for the automatic thread trimming machine. The manual describes the motor and the control box and also covers adjustments. Read the service manual carefully so that you understand the right handling and adjustment.

TABLE OF CONTENTS

DESCRIPTION OF THE MOTOR

★The Brother DC motor is best suited for the energy saving works. To save sewing labor and enhance the automation, advanced functions are installed with the reliable unit-design.

FEATURES

1. Energy Saving
Power rates is saved about 50% with the DC servomotor, as compared with the clutch motor we have made. When the sewing machine is stopped, the DC motor is also stopped, resulting in highly effective energy saving.

2. Quiet Operation
While the clutch motor produces windy or idling sounds and vibrations, the DC motor is free from them because it does not run when the sewing machine is stopped.

3. Easy Maintenance
The maintenance is easily done just by adjusting the solenoid brake spacing. There is no need to replace the moving brake plate.

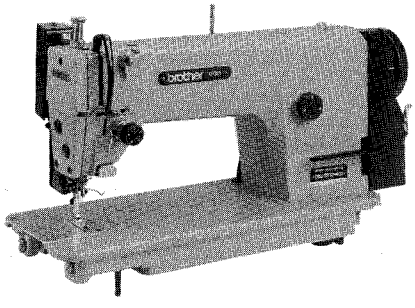
4. Reliability
The microcomputer and hybrid ICs are adopted with higher integration, so that higher reliability is obtained.

5. Free Control of Sewing Speed
The sewing speed is freely controlled just by the adjustment knob. By the high speed volume knob, the speed is controlled from 215 spm to the maximum speed. And by the reinforcement sewing speed knob, the speed is controlled from 215 spm to 3,000 spm.

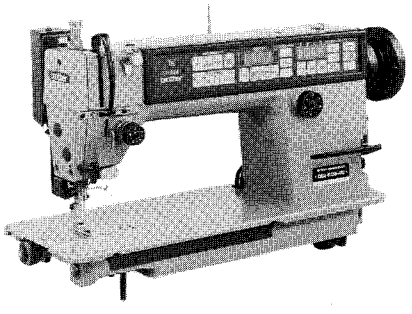
6. Applicable to Standing Work and Automation
The application for standing works and automation is secured just by connecting the switch to the plug of the control box.

7. Lightweight
The DC motor weights less 10 kg, as compared with the clutch motor.

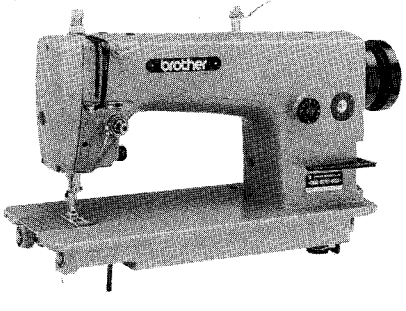
★Use the DC motor for the following sewing machines.



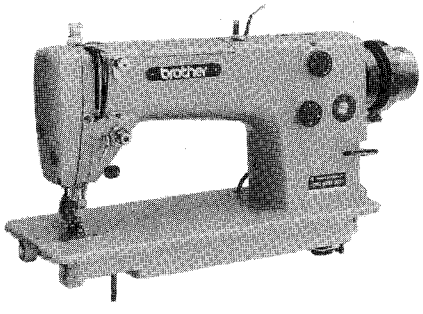
[DB2-B737]



[DB2-B738]



[DB2-B791]

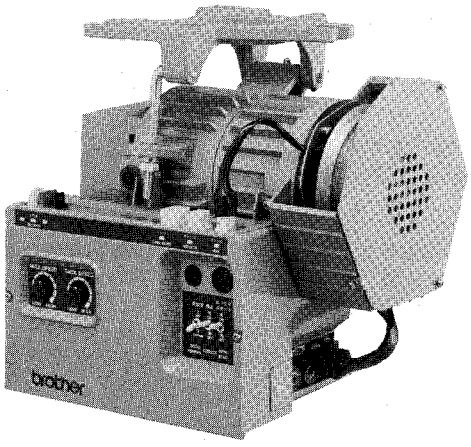


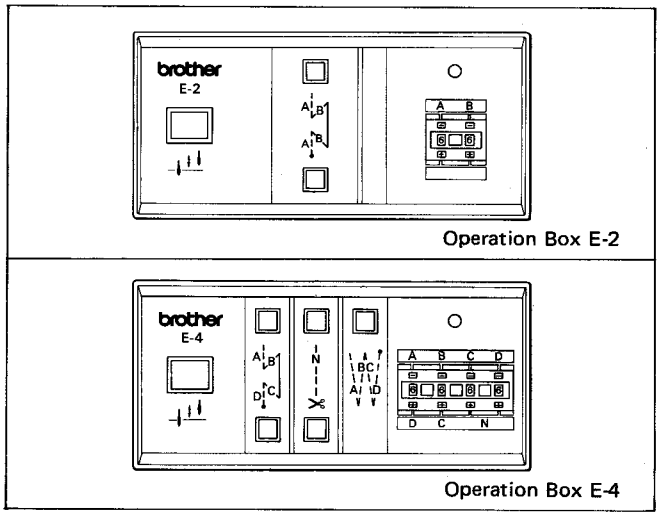
[DB2-B793]

*The DC motor is also applied to the automatic thread trimming machines, models DB2-B748, B795, and B798.

NAME OF EACH COMPONENT

The operation box is optionally available. Use the operation box which is best suited to your work.

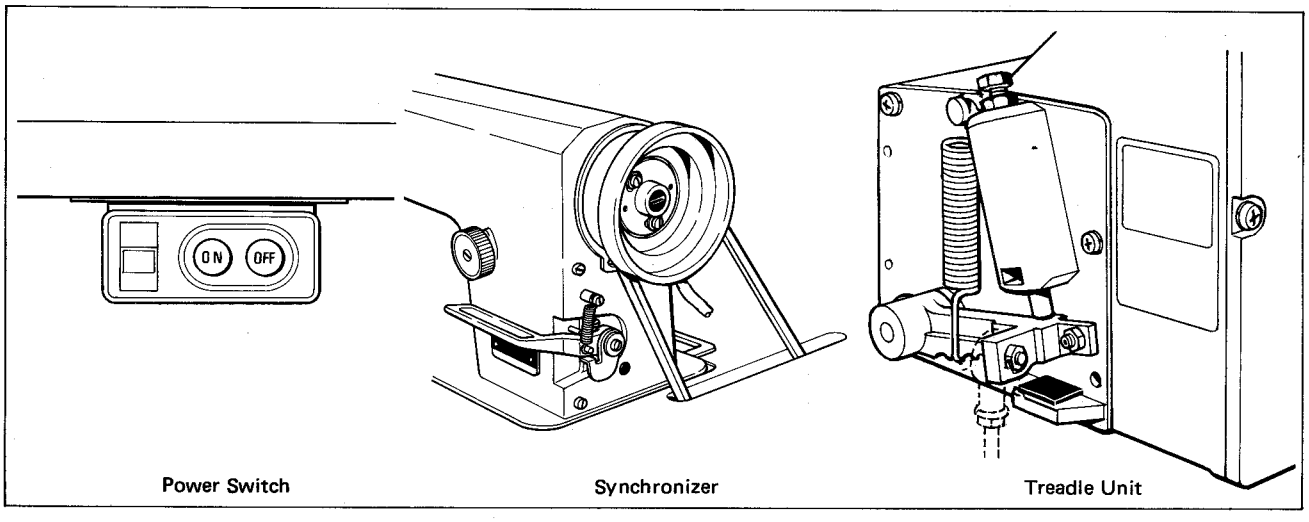




Operation Box E-2

Operation Box E-4

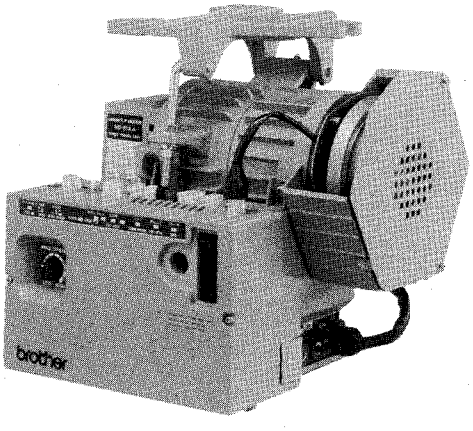
Machine Head to be Applied [DB2-B737 · B747 · B748 · B791 · B793 · B795 · B798]

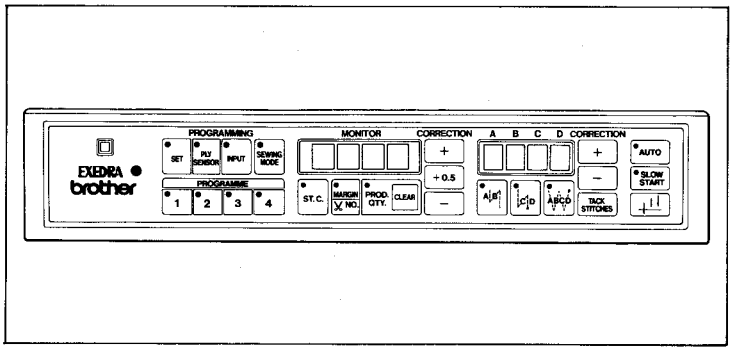


Power Switch

Synchronizer

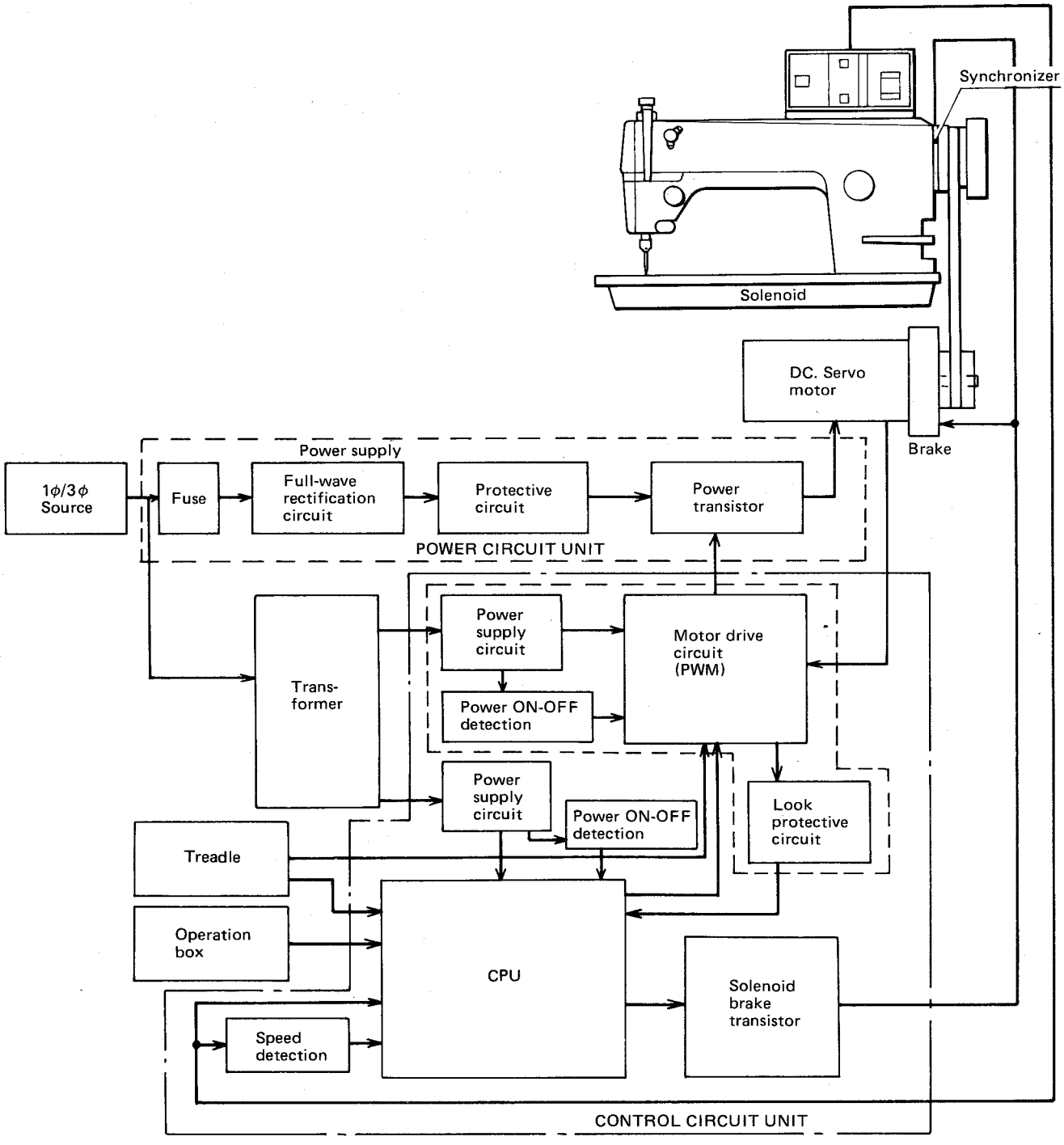
Treadle Unit





Machine Head to be Applied [DB2-B738]

CONFIGURATION

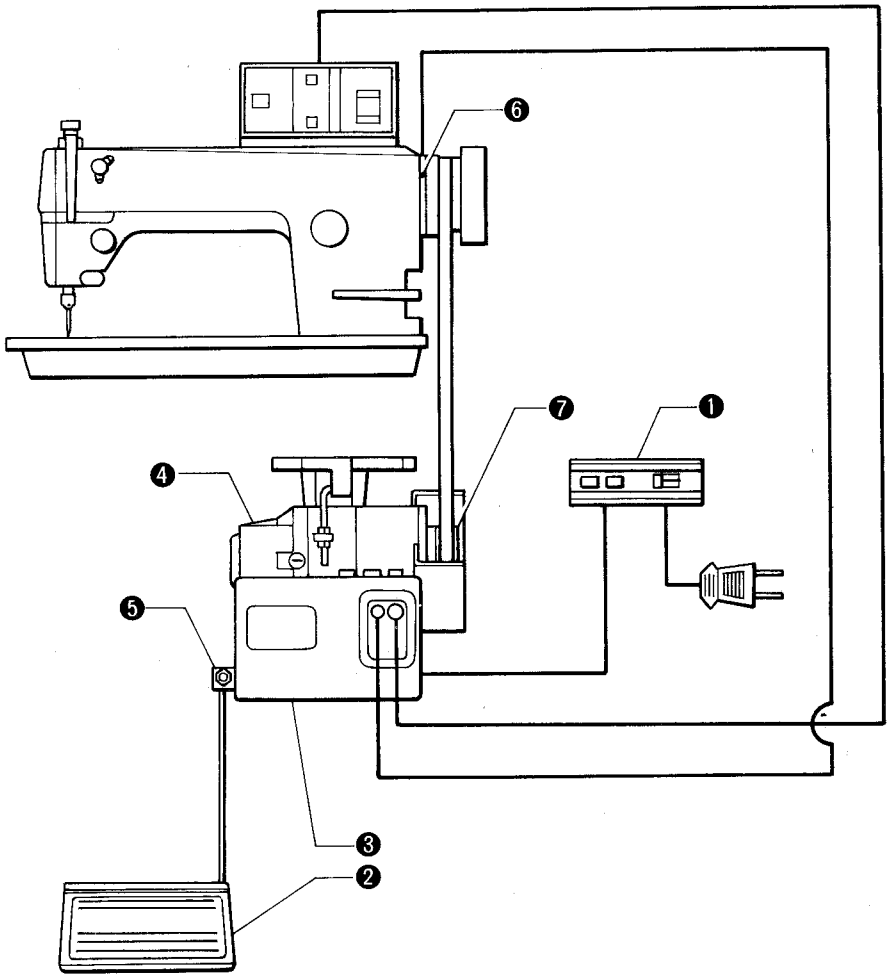


NOTE: The sections enclosed by the broken line indicate where high voltage is applied. Handle these sections with great care.

CAUTION:

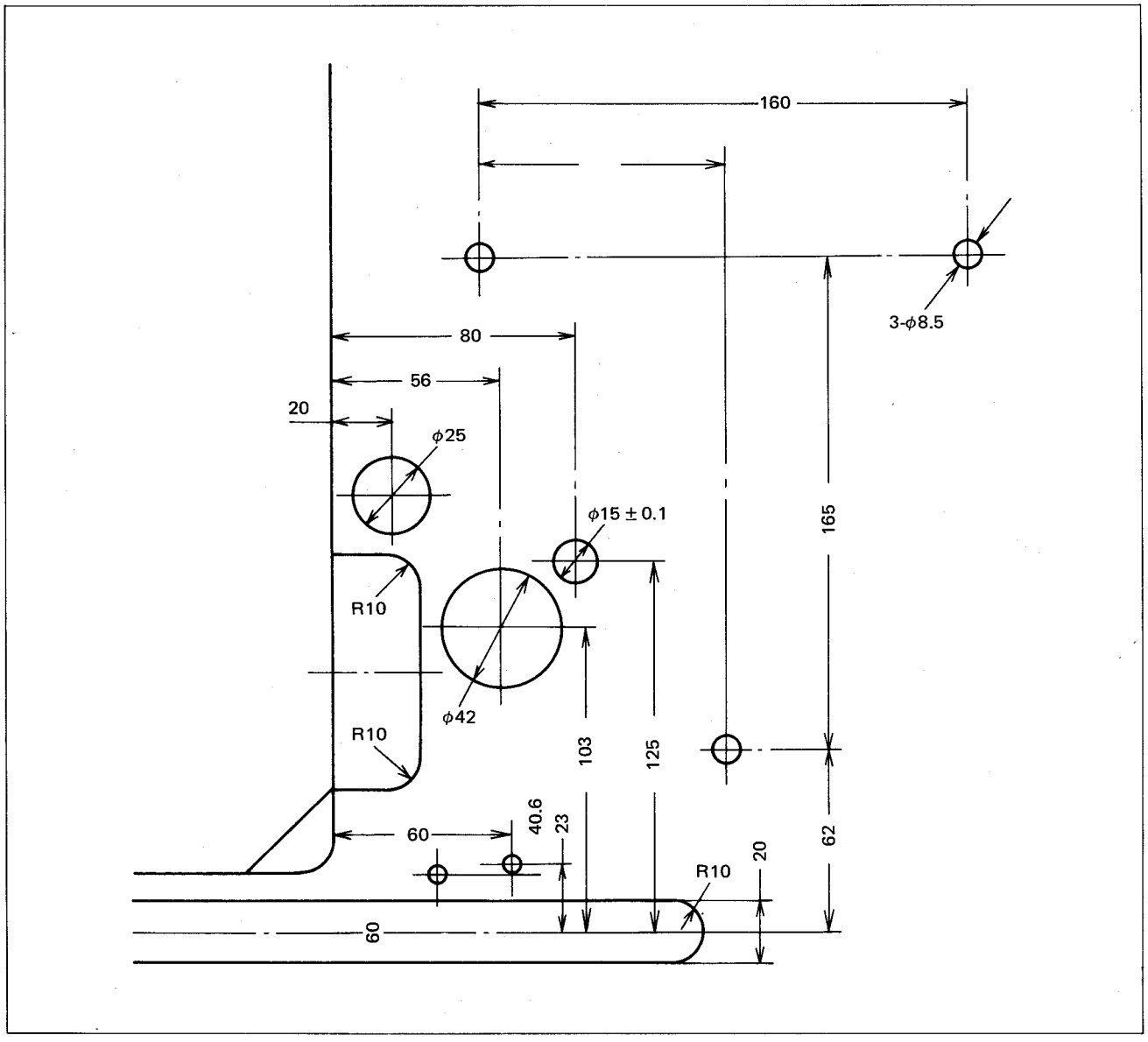
1. In setting down the machine head or touching the needle, be sure to turn off the power switch and confirm the pilot lamp "OFF".
2. Ground codes are provided for both single-phase and three-phase types. Do not fail to ground. (A ground code is not Do not fail to ground. (A ground code is not provided for single-phase 110V type, however, ground the motor frame if necessary.)
3. In adjusting the volume in the controi box, be sure to turn off the power switch, remove the front cover and confirm the pilot lamp "OFF".
   * It is dangerous to handle the control box inside because high voltage is applied. Handle with great care.
4. Keep away from such machines which make strong noise as high frequency welder for usage.

PRINCIPLE OF CONTROL SYSTEM



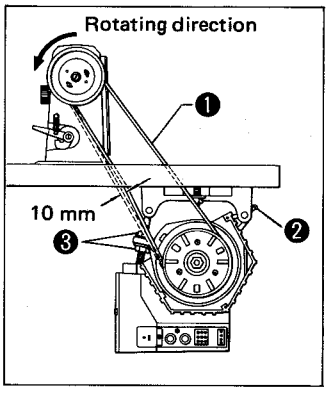
1. When the power switch ❶ is turned on and the treadle ❷ is stepped on, the start signal and the voltage corresponding to the stepping degree are supplied to the control box ❸ by the treadle unit. The voltage is supplied to the motor ❹ by the control circuit board in the control box ❸ so that the motor runs in proportion to the stepping degree to drive the sewing machine.
2. When the treadle ❷ is returned to the neutral position (with foot off), the neutral signal is sent to the control box ❸ by the treadle unit ❺ and the brake command is given by the control circuit board to decelerate the motor ❹. Then the signal from the synchronizer ❻, mounted on the pulley of the sewing machine, is sent to the control box ❸ and the brakes are applied so that the operation of the sewing machine is stopped at the needle down stop position set by the synchronizer ❻.
3. When the treadle is stepped on again, the thread trimming signal is sent to the control box ❸ by the treadle unit ❺ and the command is given by the control circuit board to run the motor ❹ at the thread trimming speed (inching speed).
   Then the signal from the synchronizer ❻ is sent to the control box ❸ and the brakes ❼ are applied so that the operation of the sewing machine is stopped at the needle up stop position set by the synchronizer ❻.

Drawing for Mounting the Motor



ADJUSTMENT

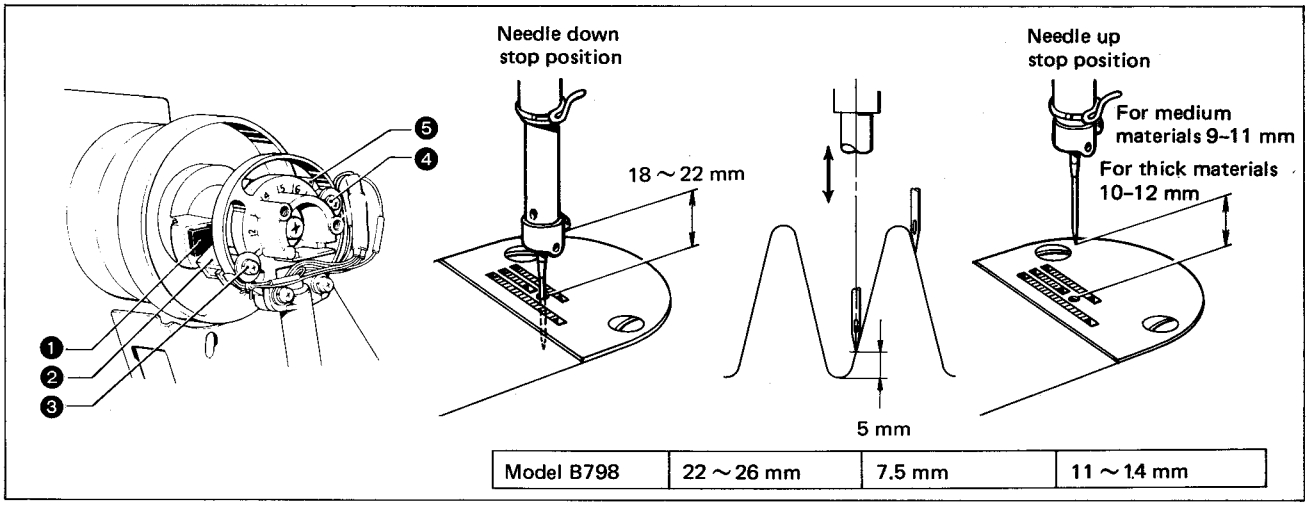
1 DC Servomotor



★Set down the machine head and then hang the belt on the motor pulley and the machine pulley.
★The belt comes to fit the machine pulley and the motor pulley, which happens to loosen the belt tension sometimes. Check the belt tension.
★The machine rotates counterclockwise as seen from the pulley side.
★Adjust the belt ❶ by loosening the set screw ❷ and turning the nut ❸ so that it loosens about 10 mm when pressed by finger.

2 Needle position detector (synchronizer)
Model DB2-B747 · B791 · B793 · B795 · B798

★Take off the synchronizer cover for adjustment. Synchronizer detects the needle by two hole IC and controls the needle down signal and the thread trimming signal by one hole IC.



Model B798	22 ~ 26 mm	7.5 mm	11 ~ 14 mm

*In adjusting each hole IC, do not fail to turn off the power switch.

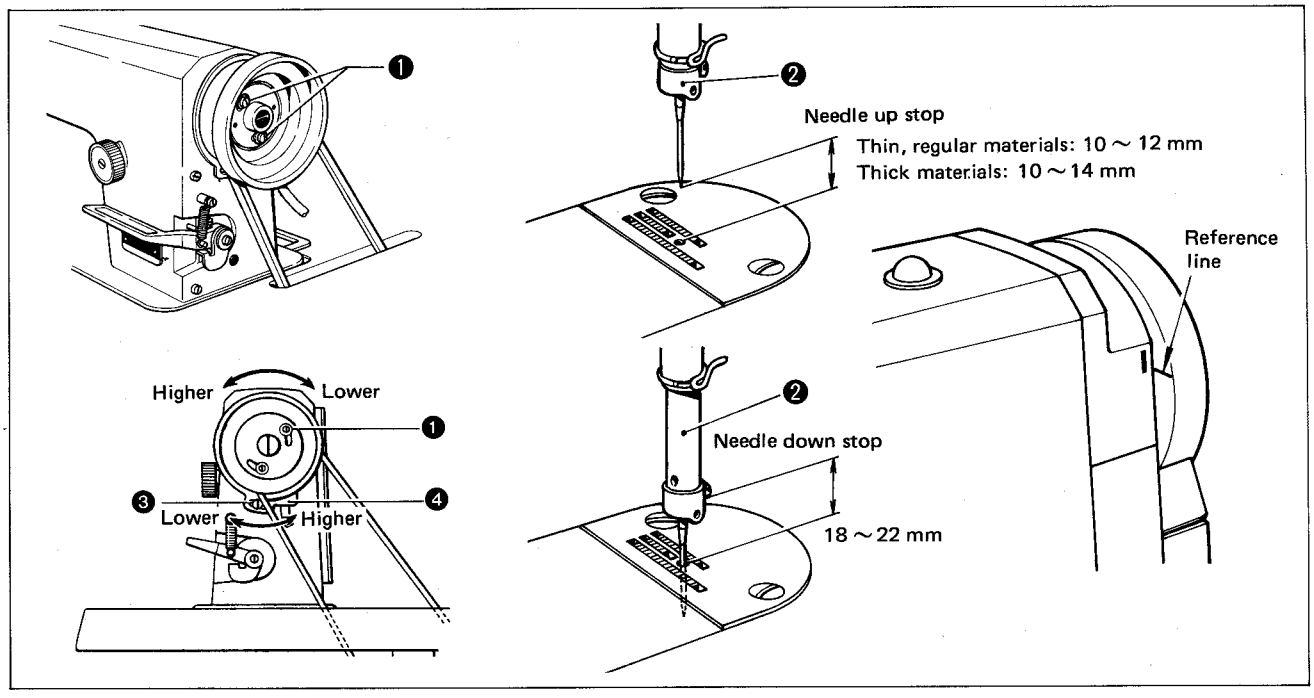
Position Adjustment for Needle Down Signal

★Turn the machine pulley this side and set the needle 5 mm up from the bottom to coincide the lower end of the magnet ❶ with the upper end of the thread trimming needle down hole IC ❷ .
(As for the model B747 · B748, adjust the needle 7 mm up from the bottom and as for the model B798, 7.5 mm up.)
When the lower end of the magnet ❶ does not coincide with the upper end of the thread trimming needle down hole IC ❷ , loosen the screw ❸ and move the thread trimming needle down hole IC for adjustment.
When the thread trimming needle down hole IC ❷ is moved in the rotating direction, the needle bar comes up. And when in the reverse direction, the needle bar comes down.
Turn on the power switch and stop the machine at the needle down stop position so that the distance between the top of the needle plate and the lower end of the needle clamp screw is 18-22 mm. (As for the model B798, the distance is 22-26 mm.)

Position Adjustment for Needle Up Signal

★Stop the machine at the needle up stop position. The needle point stops 9-11 mm away from the top of the needle plate for thin and medium materials, and 10-12 mm for thick materials.
(As for the model B798, the needle point stops 11-14 mm away.)
When the needle point does not stop properly, loosen the screw ❹ and move the needle up stop hole IC ❺ for adjustment.
When the needle up stop hole IC ❺ is moved in the rotating direction, the needle bar comes down. And when in the reverse direction, the needle bar comes up.
*Tighten the screws ❸ and ❹ by the force of 6-10 kg-cm.

Synchronizer Model DB2-B737 · B748



★The synchronizer detects the needle position with two sensors.
The thread trimmer signal is timed to the needle down position signal and the treadle reverse signal.

★When the power is turned on and the needle stopped in the down position, the distance between needle plate top and needle set screw bottom should be 18 to 22 mm.
When the needle is stopped in the up position and the pulley reference line is within the belt cover reference lines, the distance between needle plate top and needle tip should be 10 to 12 mm with thin and regular materials, 10 to 14 mm with thick materials. (As for the Model B748 the needle up stop position 10 ~ 14 mm.)
Adjust as follows when necessary.

★Turn the power off.

Needle up position

1. Slightly loosen the two screws ❶.
   Move the set screws ❶ in the direction of normal pulley movement to raise the needle bar ❷ stop position. Turn the other way to lower the needle bar.

Needle down position

1. Set the treadle to reverse and then release it to neutral. (This is the needle down stop position.)
2. The needle plate top to needle screw bottom gap should be 18 ~ 22 mm.
3. Loosen screw ❸ and move the synchronizer ❹ to adjust.

* Check the needle up stop position.

* When the machine pulley is removed once, provide 0.5 mm clearance between the pulley bottom and the synchronizer for installation.
(Improper clearance causes improper machine operation)

When the Synchronizer Is Out Of Order . . .

★Turn off the power switch and pull out the synchronizer code.
Use the machine with standard function (without thread trimming) until the synchronizer is replaced.

3 Control box

Control Box (Model DB2-B737)

The high speed volume, backtack stitch volume, power lamp, needle position switch, one-stitich modification switch, slow start switch and connector for synchronizer and connector for control box are arranged on the front of the control box. All these parts are already provided on the control circuit board.

The control circuit board is installed on the inside of the control box. The power circuit board is at the back and the treadle unit is on the left side wall.

The right side wall is furnished with one 15A fuse for the 110-240V single-phase type, two 5A fuses for the 200-240V three-phase type and two 3A fuses for 380-440V three-phase type.

The control circuit board is provided with the 8A fuse for solenoid load.

*Do not fail to secure the fuse holder cap after replacing or inspecting the fuses.

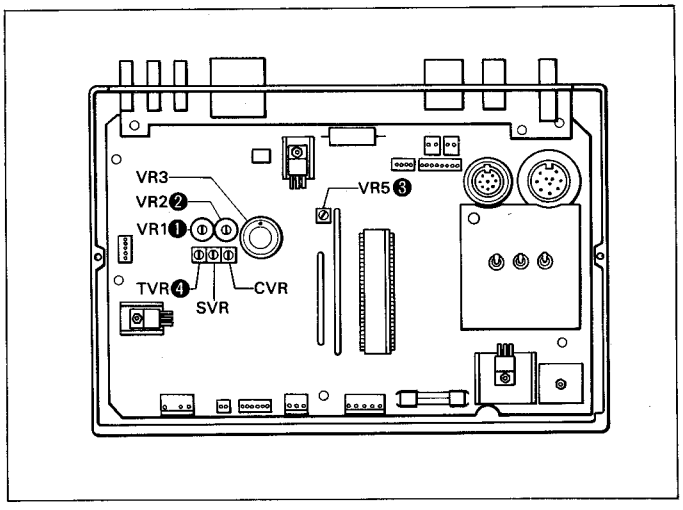
*Never short-circuit the lamp terminal (AC 6V terminal) for lighting, or the transformer may be broken.

Control circuit board

Explanation of Each Volume Knob

*Do not turn the volume knobs when not necessary.

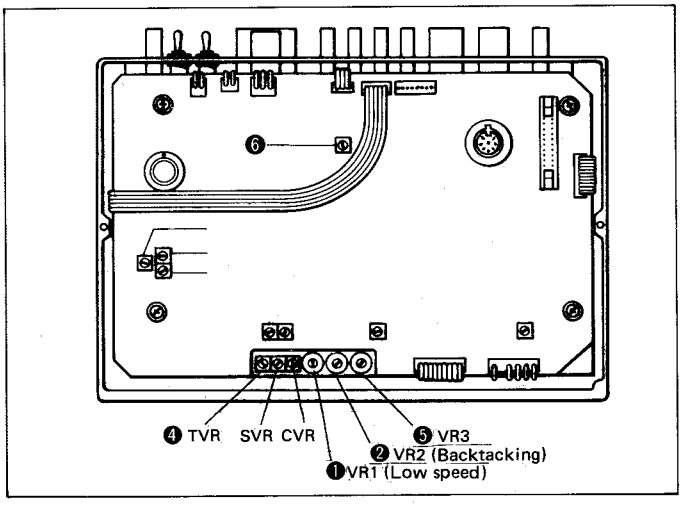
Model B737 · B747 · B748 · B791 · B793 · B795 · B798



1. Take off the front cover.
2. When the VR1 ❶ (low speed and thread trimming) is turned clockwise, the low machine speed is adjusted to increase.
3. When the VR2 ❷ (backtacking speed) is turned clockwise, the backtacking speed is adjusted to increase.
4. When the VR5 ❸ (brake-off time setting) is turned clockwise, the brake force is adjusted to increase. And when counterclockwise, it is adjusted to decrease.
5. When the TVR ❹ (torque setting) is turned clockwise, the torque is adjusted to increase.

CAUTION:
Other volume knobs are factory set, so that they never require adjustment anymore.

Model B738



1. Take off the front cover.
2. When the VR1 ❶ (low speed and thread trimming) is turned clockwise, the low machine speed is adjusted to increase.
3. The VR2 ❷ (backtacking speed) is preset at 1800 spm, so it never requires adjustment anymore. (Do not touch the VR2, or the stop position varies.)
4. The VR3 ❺ (automatic speed) is changed by the maximum sewing speed volume knob, so the VR3 requires no adjustment.
5. When the TVR ❹ (torque setting) is turned clockwise, the torque is adjusted to increase.
6. When the VR1 ❻ (brake-off time setting) is turned clockwise, the brake force is adjusted to increase. And when counterclockwise, it is adjusted to decrease.

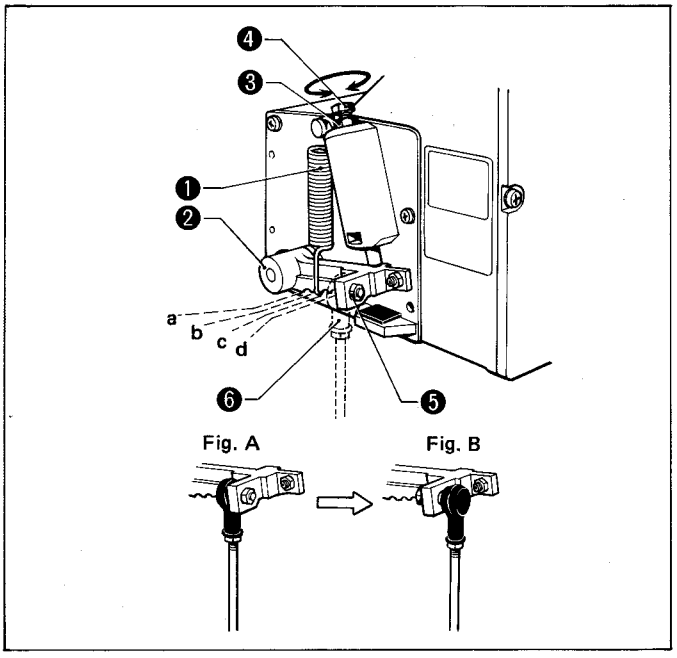
CAUTION: Other volume knobs are factory set, so that they never require adjustment anymore.

NOTE 1: It is dangerous to touch the volume knobs by finger because high voltage is applied. Do not fail to turn off the power switch before adjustment. To check the setting, turn it on again.

NOTE 2: Take care that the driver does not touch other parts but the volume knobs for adjustment. Adjust the volume knobs with great care. They may be broken if turned over the stopper.

NOTE 3: When any volume knob is turned by mistake, turn it back so that the red paint marks match with each other.

4 Treadle



Stepping Pressure

★If the machine starts running at low speed just by placing your foot on the treadle or by stepping on it lightly, the adjustment is required to change the position [(a) through (d)] where the treadle spring ❶ is hung on the treadle lever ❷.

*The stepping pressure is required more in the order from (a) to (d).

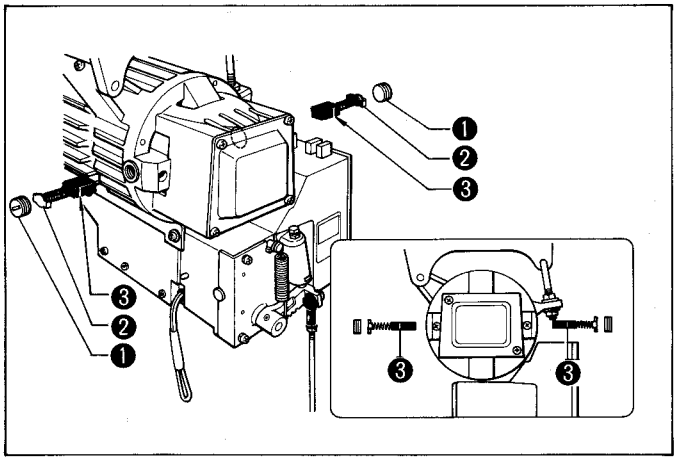
Stepping Back Pressure

★Loosen the nut ❸ and turn the bolt ❹ for adjustment. When the bolt ❹ is tightened, the stepping back responds heavily. And when loosened, it responds lightly.

Stepping Stroke

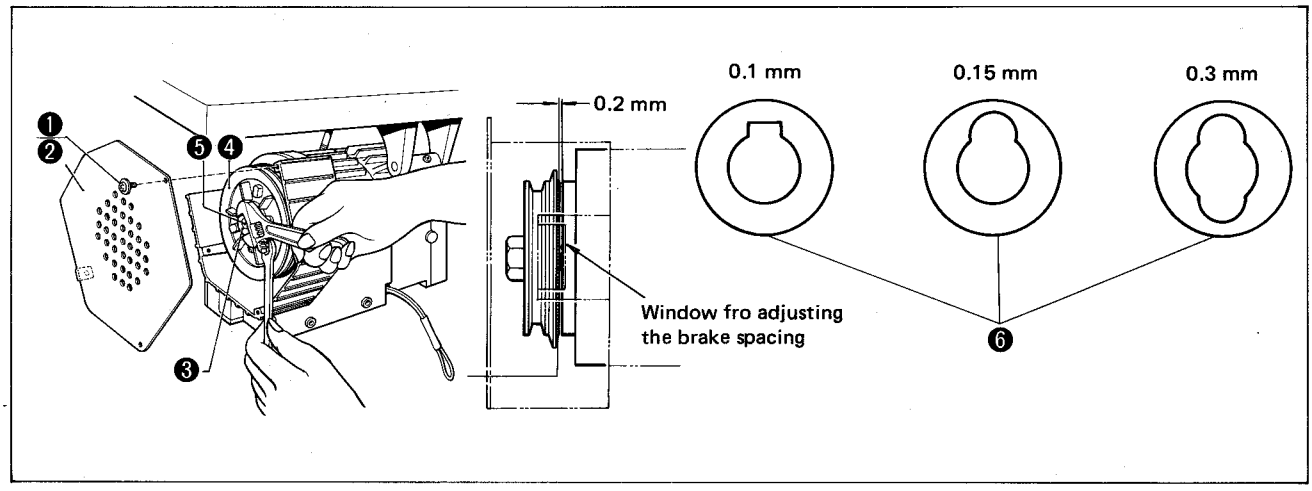
★When the nut ❺ is removed and the connecting joint ❻ is moved as shown in the figures A and B, the stepping stroke increases by 80%. When the stepping stroke is changed, the stepping and the stepping back pressures change and require re-adjustment.

5 Brush replacement



1. **Be sure to turn off the power switch.**
2. Disconnect the motor plug.
3. Remove the clamp screws ❶.
4. Remove the brushes ❷.
5. After checking the reference line of the brush ❷, mount the usable brush ❷ so that the reference line ❸ directs toward the treadle unit. Replace the brush used to the reference line ❸ with a new one.
6. Tighten the clamp screws ❶ with 10-15 kg/cm torque.
7. Connect the motor plug.

6 Motor brake spacing

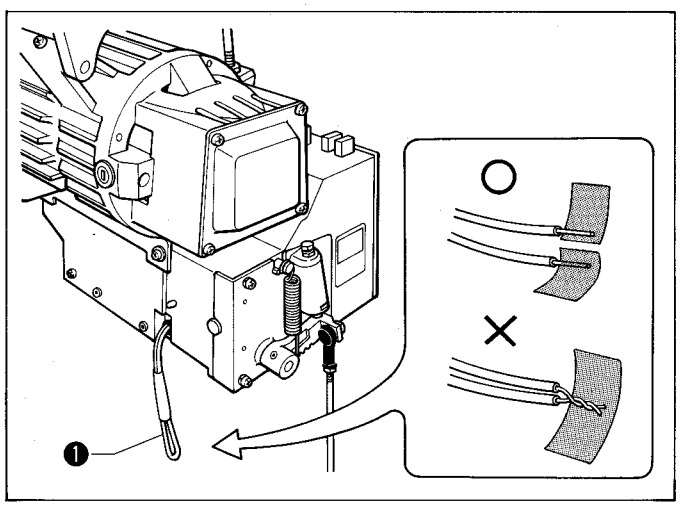


★Adjust the brake spacing when about two years have passed. And also adjust when the brake generates abnormal noises and does not stop stably.

Adjustment Procedures

1. It is recommended that you remove the motor pulley and measure the brake spacing in advance. The brake spacing is factory set at approx. 0.2 mm.
2. Remove the screw ❶ and the pulley cover ❷.
3. Remove the V belt.
4. Remove the nut ❸ and the motor pulley assembly ❹.
5. Remove the washer ❻ from the shaft ❺ so that the brake spacing becomes 0.2 mm. The washer ❻ is available with the thickness, 0.1 mm, 0.15 mm and 0.3 mm. Adjust the brake spacing approx. 0.2 mm by removing the washer ❻.

7 Checking the lamp terminal code



★The lamp terminal code ❶ is provided at the back of the control box. The AC 6 V lamp can be connected with this lamp terminal code.

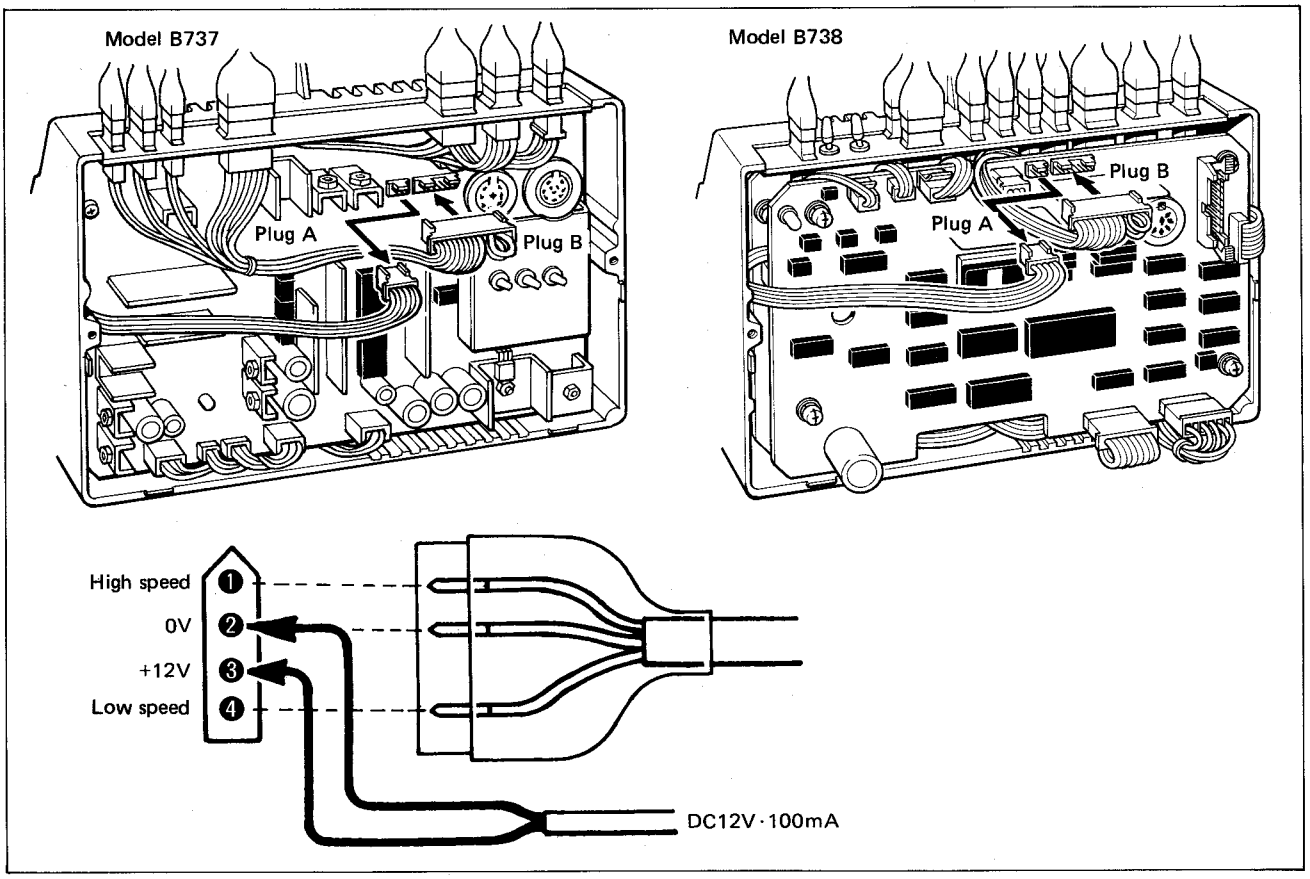
CAUTION:

Be sure to wrap the end of the cord with tape after disconnecting the lamp code.

8 Standing work machine

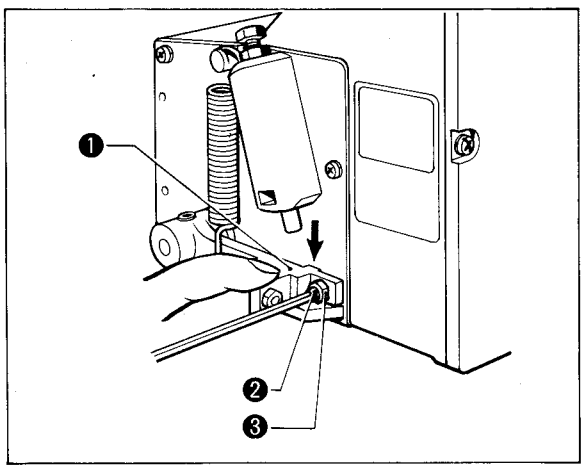
★The code connection and the treadle lever are fixed for the standing work machine.
In modifying to the standing work machine, do not fail to turn off the power switch before connecting/disconnecting the plug.

1. Code Connection



★Do not fail to turn off the power switch before connecting/disconnecting the plug.
★Remove the motor cover.
Disconnect the plug A and connect the plug B instead.
★For the standing work machine modified, the power source for the timer, relay, sensor, counter and so on is available from the 4P plug in the control box.
*The power up to DC 12 V · 100 mA is available from the 4P plug (red) where the treadle plug is connected.
(Take great care not to apply the current of 100 mA or more to affect the function of the control box, or the machine malfunctions.)

2. Treadle Lever Position

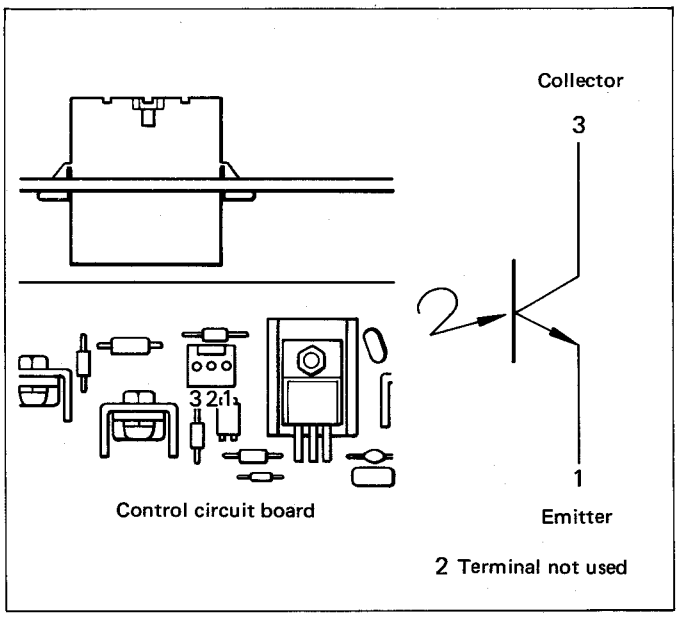


★While keeping the treadle lever ❶ lowered, turn the screw ❷ and set into the recessed.
Secure the screw ❷ with the nut ❸ , or it happens to be loose.

9 Application to production control system

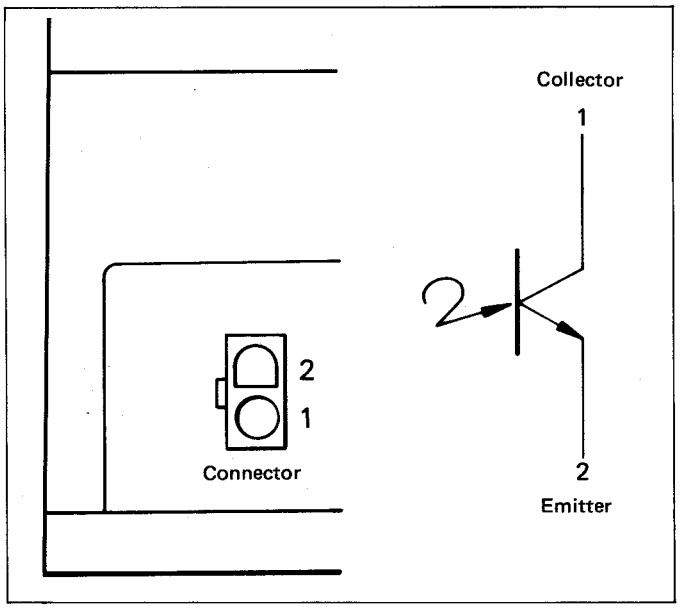
1. Models DB2-B737 · B747 · B791 · B793 · B795 · B798

★The control circuit board is procided with the tread trimming output terminal.
This terminal is available for connecting to the external equipment.



★Output signals are sent from the open collector of the photo transistor of the photo coupler. (Use the CN11 plug.)
Max. operating current: DC20 mA or less
Max. operating voltage: DC20 V or less

2. Model B738

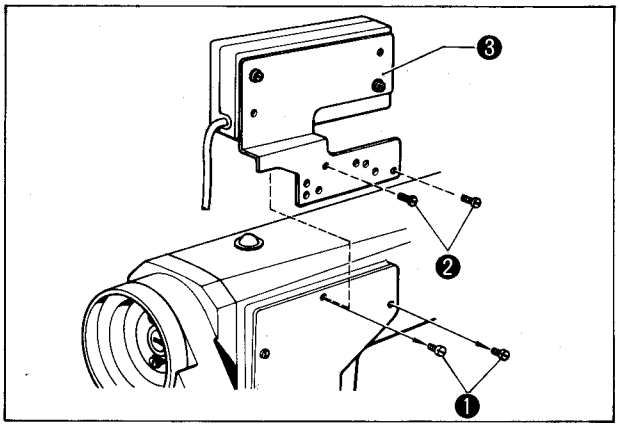


★With special connectors (cycle output), connect the machine to the external equipments.
★Output signals are sent from the open collector of the photo transistor of the photo coupler.
Max. operating current: DC20 mA or less
Max. operating voltage: DC20 V or less

OPERATION INSTRUCTION

1 Installation of operation box

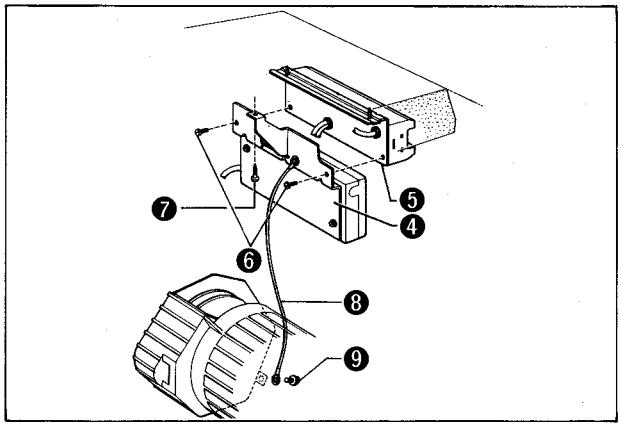
Models DB2-B737 · B747 · B748 · B791



Installing on the Machine Head

1. Remove the two screws ❶ from the back of the arm bed.
2. Four screws ❷ are provided. Use two large screws for the model B737. And use the other two small screws for the models B747 · B748 · B791 · B793 · B795 · B798.
3. Set the operation box mounting plate ❸ on the back of the arm bed with the screws ❷.

Models DB2-B793 · B795 · B798

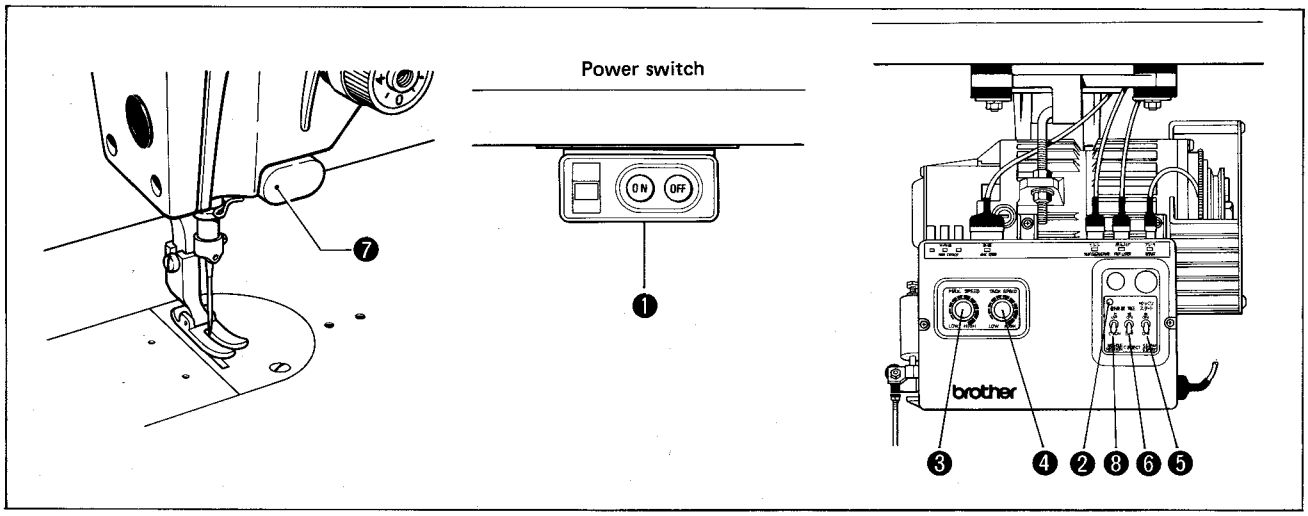


Installing on the Table

1. Set the operation box mounting plate ❹ on the back of the power switch mounting plate ❺ with the screws ❻.
2. Fix the mounting plate ❹ on the back of the table with the wood screw ❼.

*Secure the ground wire ❽ to the motor with the screw ❾.

2 Motor control and control box use (Models DB2-B737 · B747 · B748 · B791 · B795 · B798)



★Push the "ON" button of the power switch ❶ . Then the power lamp ❷ goes on.

★When the speed adjustment knob ❸ is turned clockwise, the machine speed increases. And when counterclockwise, it decreases. The machine speed can be adjusted from 215 spm up to the maximum.

★When the backtack speed adjusting knob ❹ is turned clockwise, the start backtack speed increases. And when counterclockwise, it decreases. The start and continuous backtack speeds can be changed from 215 spm to 3,000 spm. The end backtack speed allows no change at 1,800 spm.

★When the slow start switch ❺ is turned on, the machine starts running at low speed for the first two stitches (after thread trimming and stop at the needle up position). Then the machine keeps on running in proportion as you step on the treadle.

★When the correction switch ❻ is turned on and the actuator ❼ is pushed with the machine stopped, the machine starts correction sewing operation. When the actuator is pushed during operation, the sewing operation is reversed.

★When the needle position set switch ❽ is set to the needle down position and the machine is stopped during the sewing operation, the needle stops at the needle down position. When it is set to the needle up position and the machine is stopped during the sewing operation, the needle stops at the needle up position.

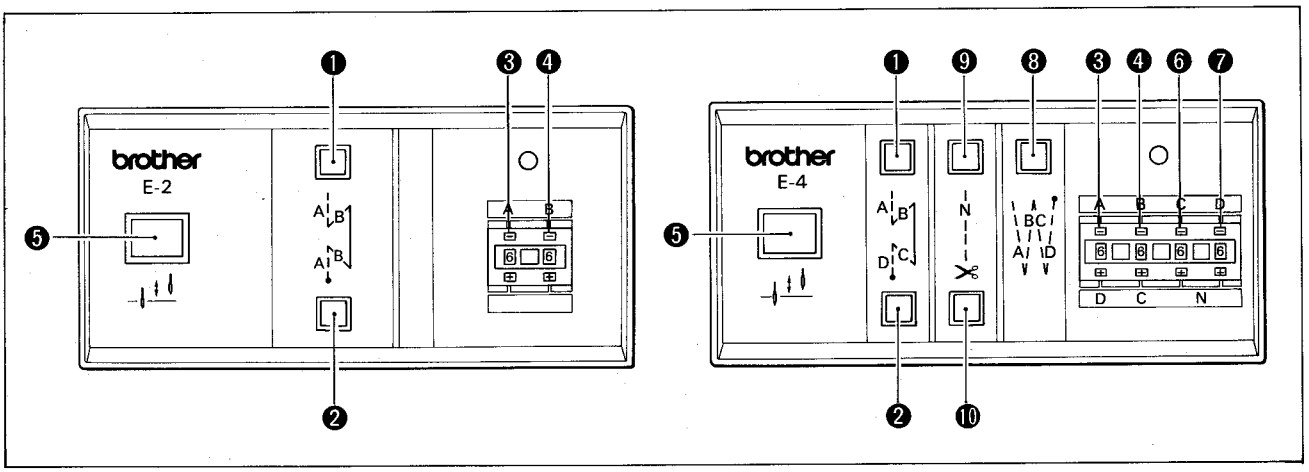
3 Operation box (Models DB2-B737 · B747 · B791 · B793 · B795 · B798)

★The switch settings and the number of stitches cannot be changed during the machine operation. Check the preset switch settings and the preset number of stitches before working with the machine.

★When the backtack switch is pressed, the indicator turns on. It goes off by pressing the switch again.

★When the upper counter switch is pressed, the number of stitches decreases. And when the lower switch is pressed, the number increases.

★The machine runs according to the programmed pattern after setting as follows.



Box E-2

□ **For Backtacking**

1. Press the switch ❶ for start backtacking, forward A and reverse B.
2. Press the switch ❷ for end backtacking, reverse B and forward A.
3. Set the start and end backtack stitch number A (0 to 9) with the counter ❸.
4. Set the start and end backtack stitch number B (0 to 9) with the counter ❹.

*Set the stitch number A to "0" for V stitch.

*When the treadle is stepped on, the machine backtacks.

□ **For Half Stitch Switch**

★When the machine is stopped with the half stitch switch pressed, the needle at the needle down stop position moves to the needle up stop position, while the needle at the needle up stop position moves to the down stop position. The needle moves up or down every time the switch ❺ is pressed.

***Thread trimming cannot be executed after this switch ❺ is used. First of all, step on the treadle for thread trimming.**

Box E-4

□ **For Backtacking**

1. Press the switch ❶ for start backtacking A and B.
2. Press the switch ❷ for end backtacking C and D.
3. Set the start backtack stitch number A (0 to 9) with the counter ❸.
4. Set the start backtack stitch number B (0 to 9) with the counter ❹.
5. Set the end backtack stitch number C (0 to 9) with the counter ❻.
6. Set the end backtack stitch number D (0 to 9) with the counter ❼.

□ **For Continuous Backtacking**

★Press the continuous backtack switch ❽, and set the stitch number with the counter switches A, B, C and D. The machine runs in a cycle of A, B, C, and D, then stops running.

□ **For Fixed Stitch Sewing**

1. Press the switch ❾ for the fixed stitch sewing N.
2. The number of stitches N can be set from 1 through 99 with the end backtack stitch counters C ❻ and D ❼.
3. The number of stitches for the end backtacking during the fixed stitch sewing can be set using the counter A (D) and B (C).

□ **For Fixed Stitch Sewing and Thread Trimming**

With the switch ❿ pressed, the fixed stitch sewing is completed up to the set stitch number (1 through 99) and the thread trimming is done just by stepping on the treadle.

*The half stitch switch of the box E-4 is same as E-2.

□ **Guide to E-2 and E-4 switches**

★Items indicated with a circle in the chart below require a stitch number setting.
Items with no symbol require no setting.

★Symbols used in figures below

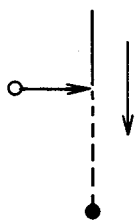
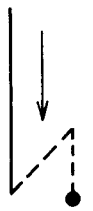
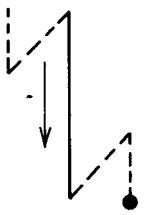
○ . . . . The machine works by one correction stitch if the actuator is pressed when the machine is stopped and the correction switch is ON. If the actuator is pressed while the machine is operating, the machine enters the reverse sewing mode. When the machine is at the sewing start position after thread trimming, the machine does not move even if the actuator is pressed.

● . . . . Thread trimming (Thread trimming is performed when the treadle is pressed to the reverse position.)

. . . . . Indicates thread trimming following fixed stitch sewing or end backtack.
(Thread trimming is performed without pressing the treadle to the reverse position.)

E-2

Application	Start backtack switch	End backtack switch	Stitch number setting		Reference figure No.
			A	B	
Normal lock stitch	OFF	OFF			1
Start backtack	ON	OFF	○	○	2
End backtack	OFF	ON	○	○	3
Start/end backtack	ON	ON	○	○	4

No.1 Normal lock stitch	No.2 Start backtack	No.3 End backtack	No.4 Start/end backtack
			

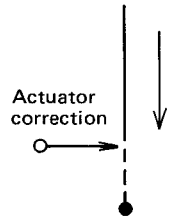
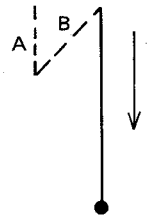
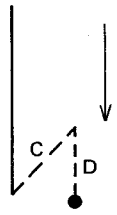
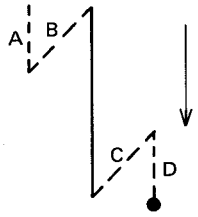
Thread trimming is performed when the treadle is set to reverse position.

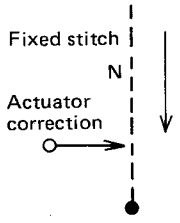
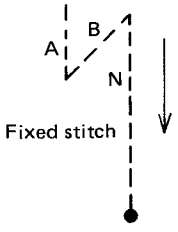
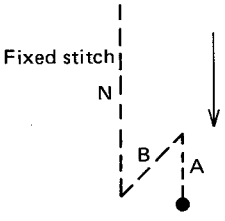
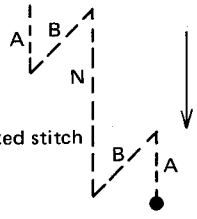
Thread trimming is performed after end backtack when the treadle is set to the reverse position.

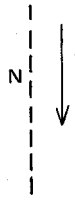
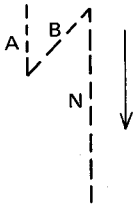
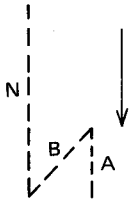
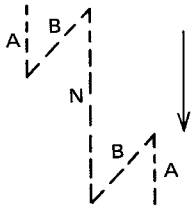
E-4

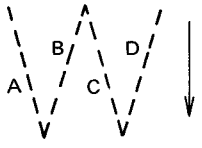
Application		Start backtack switch	End backtack switch	Fixed stitch switch	Thread trimming switch	Continuous backtack switch	Stitch number setting				Reference figure No.	Note
							A	B	C	D		
							(D) · (C)		N			
Fixed stitch sewing OFF	Normal lock stitch	OFF	OFF	OFF	OFF	OFF					1	
	Start backtack	ON	OFF	OFF	OFF	OFF	○	○			2	
	End backtack	OFF	ON	OFF	OFF	OFF			○	○	3	
	Start/end backtack	ON	ON	OFF	OFF	OFF	○	○	○	○	4	
Fixed stitch sewing ON (thread trimming activated by setting treadle to reverse)	Fixed stitch sewing	OFF	OFF	ON	OFF	OFF			○	○	5	
	Start backtack	ON	OFF	ON	OFF	OFF	○	○	○	○	6	
	End backtack	OFF	ON	ON	OFF	OFF	○	○	○	○	7	End backtack B/A
	Start/end backtack	ON	ON	ON	OFF	OFF	○	○	○	○	8	End backtack B/A
Fixed stitch sewing with thread trimming ON (thread trimming performed with treadle depressed forward)	Fixed stitch sewing	OFF	OFF	ON	ON	OFF			○	○	9	
	Start backtack	ON	OFF	ON	ON	OFF	○	○	○	○	10	
	End backtack	OFF	ON	ON	ON	OFF	○	○	○	○	11	End backtack B/A
	Start/end backtack	ON	ON	ON	ON	OFF	○	○	○	○	12	End backtack B/A
Continuous backtack (Automatic thread trimming after programmed cycle completed)		OFF	OFF	OFF	OFF	ON	○	○	○	○	13	

Normal lock stitch sewing is performed after the fixed stitch sewing sequence is completed until thread trimming is completed. (No. 5 through 8 in the above table.)

No.1 Normal lock stitch	No.2 Start backtack	No.3 End backtack	No.4 Start/end backtack
			
Thread trimming activated by reversing the treadle.		Thread trimming activated after end backtack by reversing the treadle.	

No.5 Fixed stitch sewing only	No.6 Start backtack and fixed stitch sewing	No.7 Fixed stitch sewing and end backtack	No.8 Start/end backtack and fixed stitch sewing
			
Thread trimming activated by reversing the treadle.		Thread trimming activated after end backtack by reversing the treadle.	

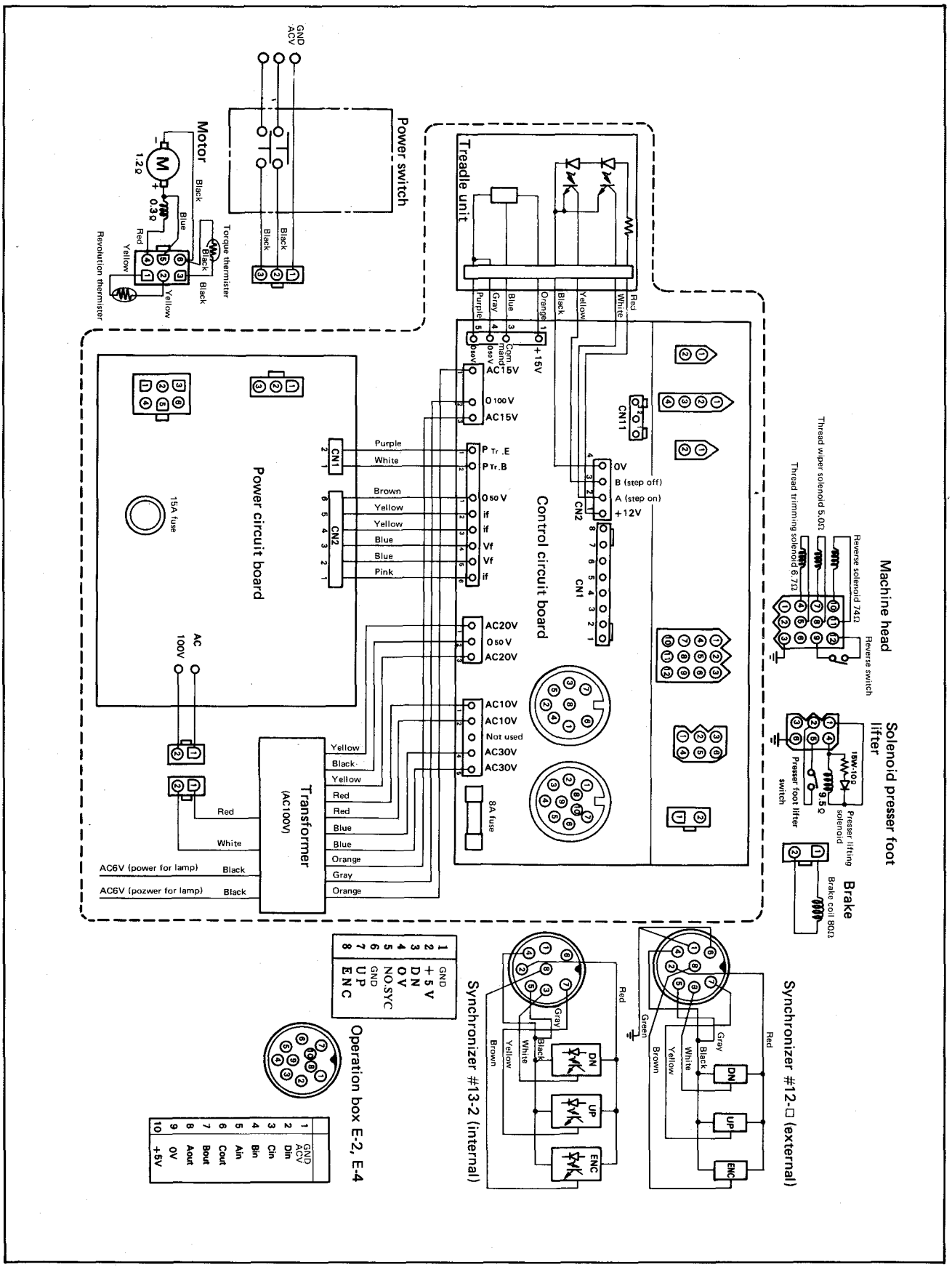
No.9 Fixed stitch and thread trimming	No.10 Start backtack, fixed stitch and thread trimming	No.11 Fixed stitch, end backtack and thread trimming	No.12 Start/end backtack, fixed stitch and thread trimming
			
Sewing completed through thread trimming by holding the treadle depressed.			

No.13 Continuous backtack

Sewing completed through thread trimming by holding the treadle depressed.

BLOCK DIAGRAM OF CONTROL CIRCUIT

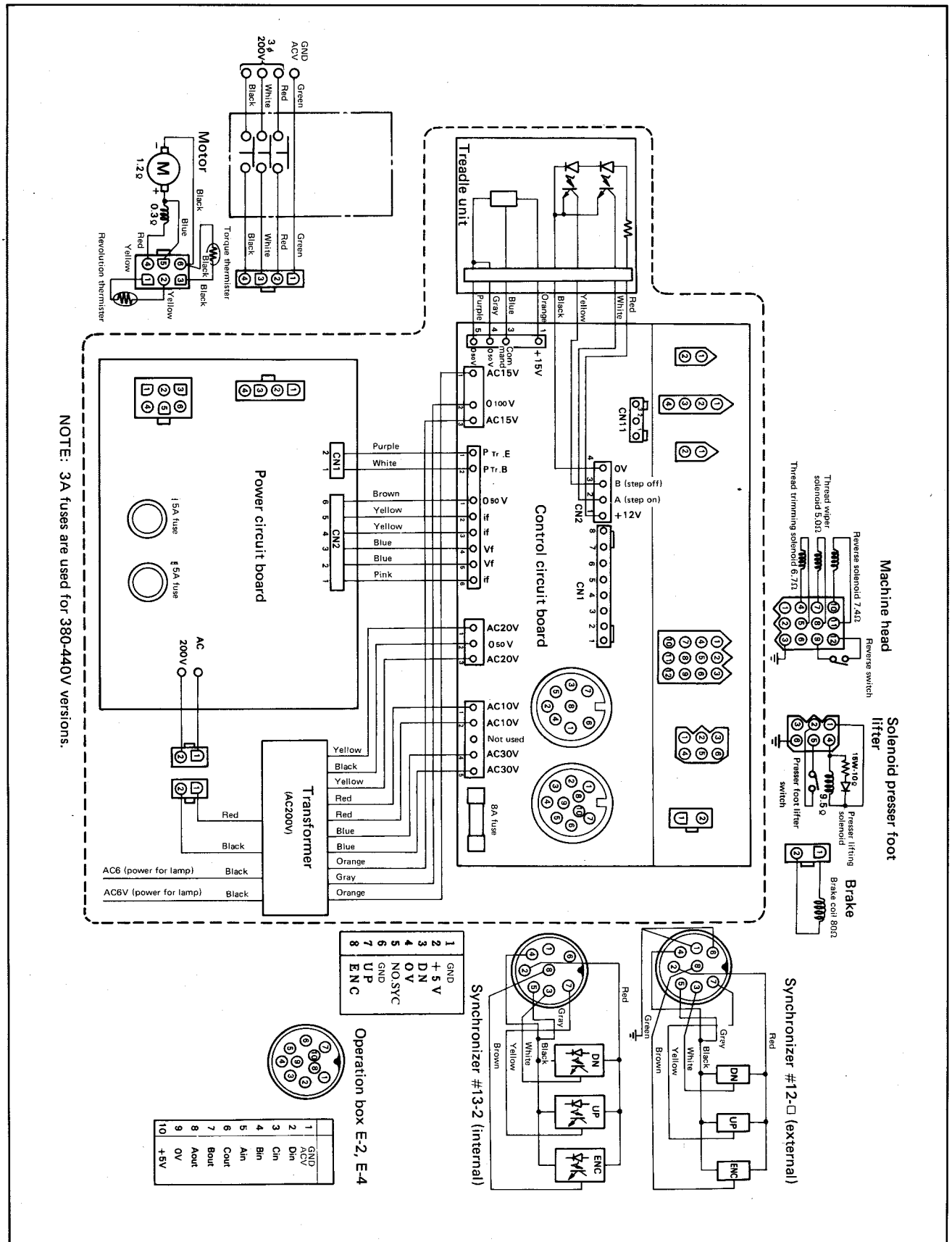
1 Single-phase/100V (Models DB2-B737 · B747 · B748 · B791 · B793 · B795 · B798)

1. The connector is shown from the pin side.
2. The section indicated by the broken line shows the inside of the control box.



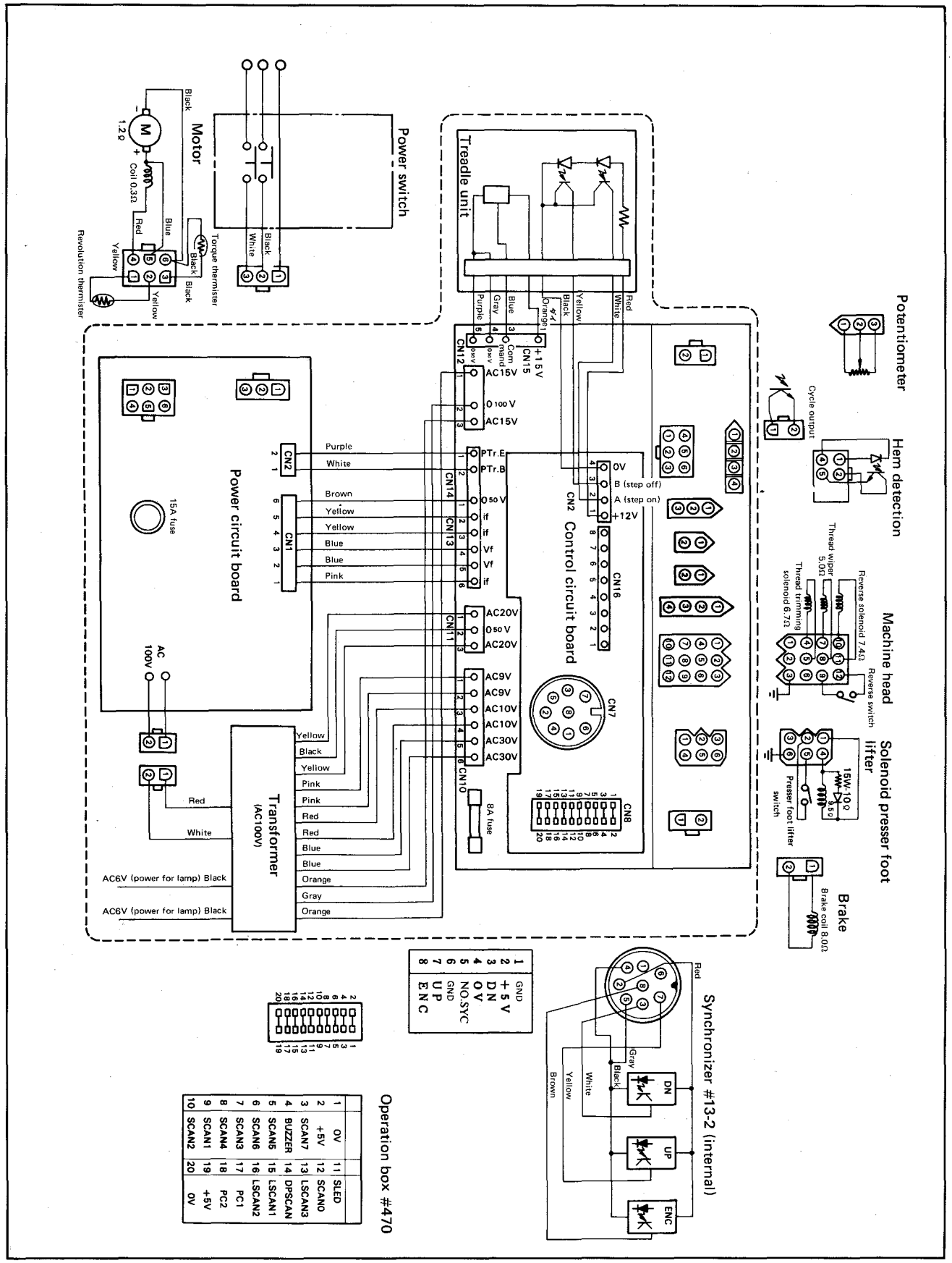
2 Three-phase/ACV (Models DB2-B737 · B747 · B748 · B791 · B793 · B795 · B798)

1. The connector is shown from the pin side.
2. The section indicated by the broken line shows the inside of the control box.



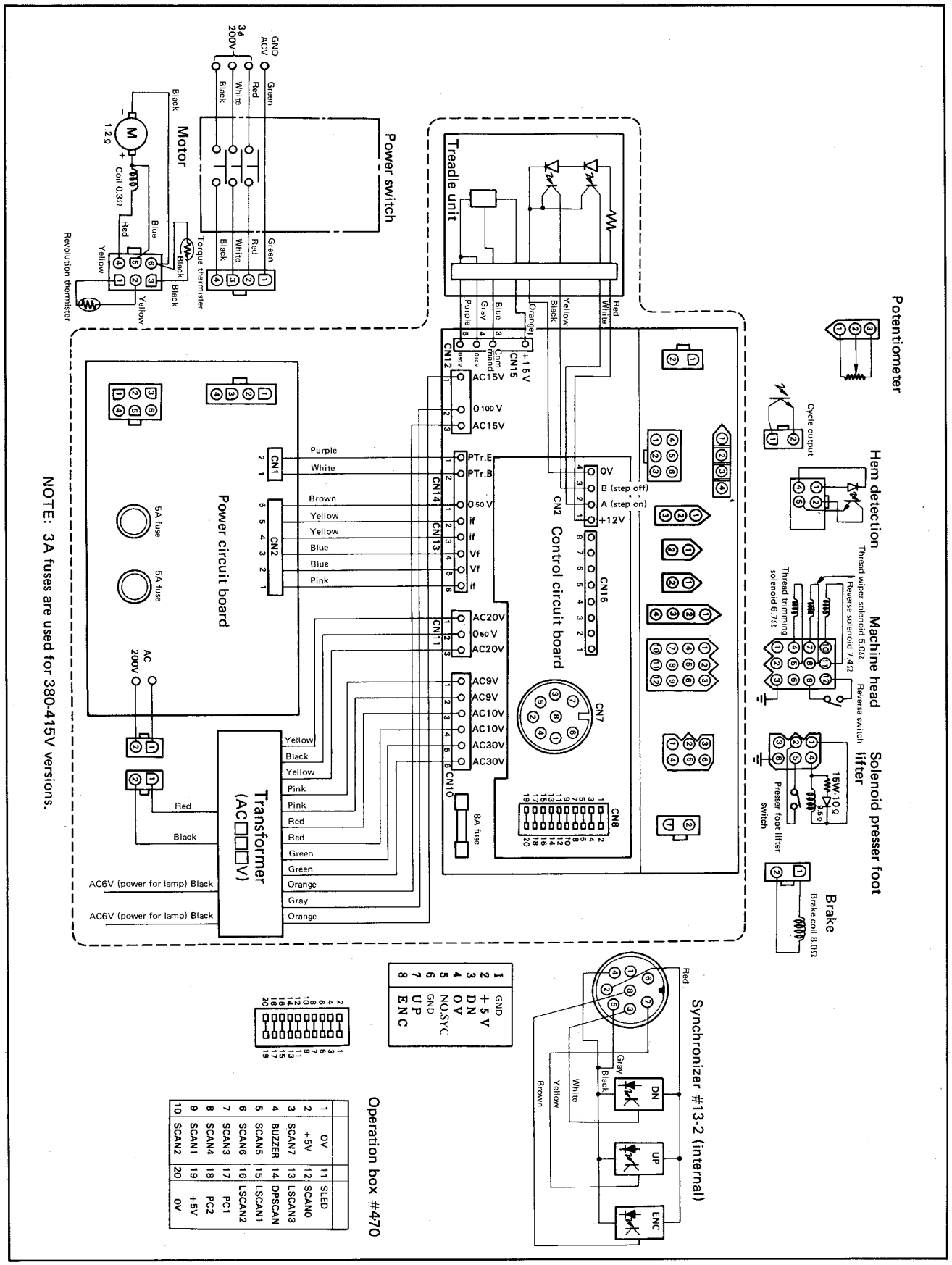
3 Single-phase/100V type #470B (Model DB2-B738)

1. The connector is shown from the pin side.
2. The section enclosed by the broken line shows the inside of the control box.



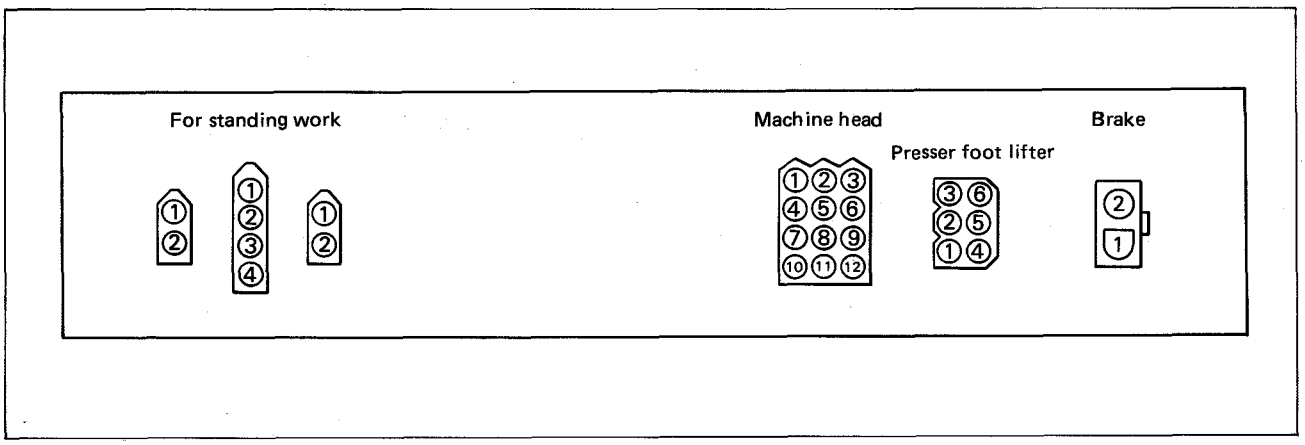
4 Three-phase/AC V type #470 (Model DB2-B738)

1. The connector is shown from the pin side.
2. The section enclosed by the broken line shows the inside of the control box.

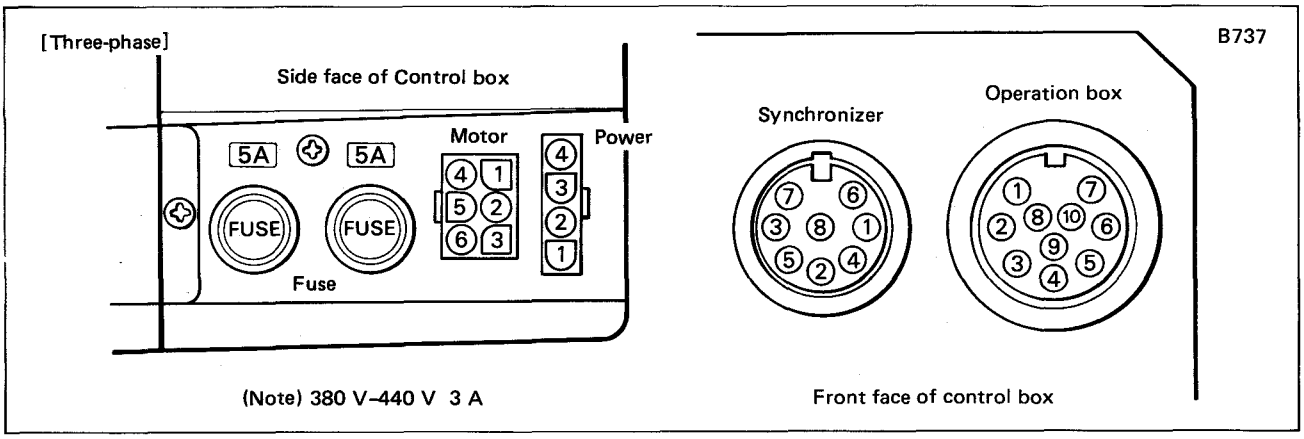


DETAILS OF CONNECTOR PANEL

1 Model DB2-B737 · B747 · B748 · B791 · B793 · B795 · B798 (Type 300B)



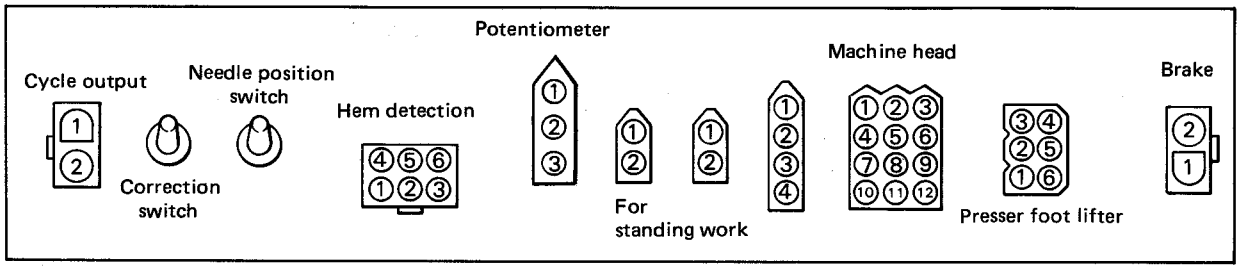
No.	For standing work			Machine head	Presser foot lifter	Brake
	2P connector (white)	4P connector (red)	2P connector (black)	12P connector	6P connector	2P connector
1	Presser	High speed	Thread trimming	Leading power	Presser power	Brake power
2	0 V	0 V	0 V	Leading output	Presser input	Brake
3		DC + 12 V		GND	Option	
4		Low speed		Thread trimming power	Presser output	
5				Thread trimming output	0 V	
6				Not used	GND	
7				Thread wiper power		
8				Thread wiper output		
9				Reverse input		
10				Reverse power		
11				Reverse output		
12				0 V		



No.	Motor	Power
	6P connector	4P connector
1	Vf. TH	GND
2	Vf. TH	AC 200 V
3	if. TH	AC 200 V
4	Motor +	AC 200 V
5	Vf	
6	Motor −	

No.	Synchronizer	Operation box
1	GND	GND
2	DC + 5 V	Din
3	Needle down	Cin
4	0 V	Bin
5	NO. SYC	Ain
6	GND	Cout
7	Needle up	Bout
8	Encoder	Aout
9		0 V
10		DC + 5 V

2 Model DB2-B738 (Type #470B)

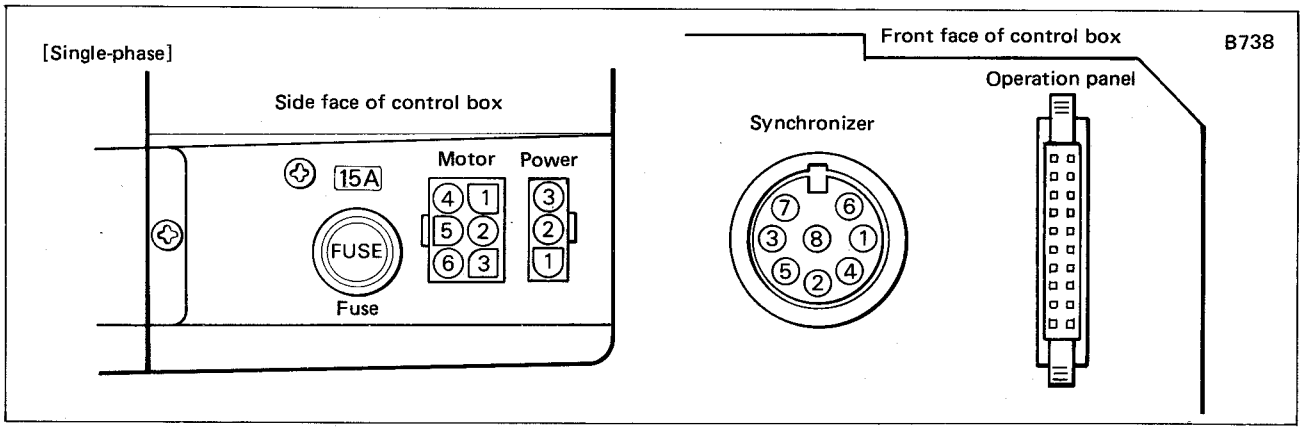


No.	Cycle output	Hem detection	Potentiometer
	2P connector	6P connector	3P connector
1	Collector	Anode	+5 V
2	Emitter	Collector	Output
3			0 V
4		Cathode	
5		Emitter	
6			

No.	Machine head	Presser foot lifter
	12P connector	6P connector
1	Leading power	Cloth presser power
2	Leading output	Presser input
3	GND	Option
4	Thread trimming power	Cloth presser output
5	Thread trimming output	0 V
6	Not used	GND
7	Thread wiper power	
8	Thread wiper output	
9	Reverse input	
10	Reverse power	
11	Reverse output	
12	0 V	

No.	For standing work		
	2P connector (white)	2P connector (black)	4P connector (red)
1	Cloth presser	Thread trimming	High speed
2	0 V	0 V	0 V
3			DC + 12 V
4			Low speed

No.	Brake
	2P connector
1	Brake power
2	Brake



No.	Motor	Power
	6P connector	3P connector
1	Vf. TH	GND
2	Vf. TH	AC 100 V
3	if. TH	AC 100 V
4	Motor +	
5	Vf	
6	Motor −	

No.	Synchronizer	No.	Operation panel		
1	GND	1	0 V	11	SLED
2	DC + 5 V	2	DC + 5 V	12	SCAN 0
3	Needle down	3	SCAN 7	13	LSCAN 3
4	0 V	4	BUZZER	14	DPSCAN
5	NO. SYC	5	SCAN 5	15	LSCAN 1
6	GND	6	SCAN 6	16	LSCAN 2
7	Needle up	7	SCAN 3	17	PC 1
8	Encoder	8	SCAN 4	18	PC 2
		9	SCAN 1	19	DC + 5 V
		10	SCAN 2	20	0 V

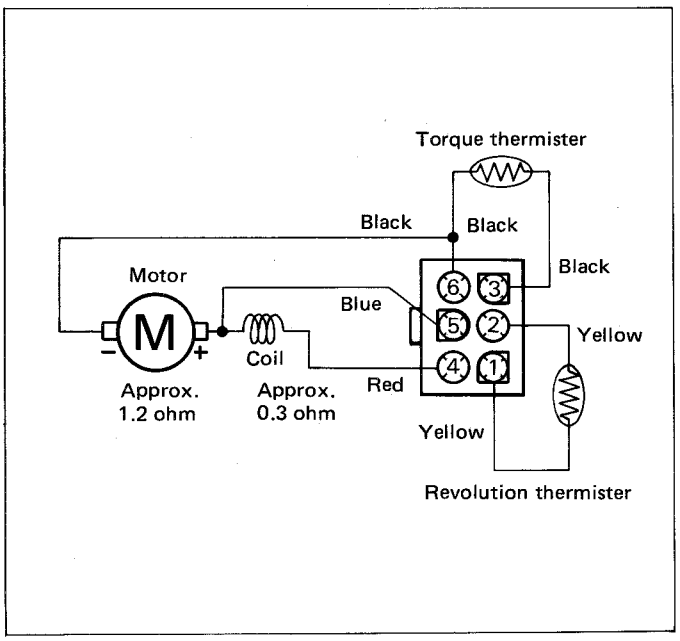
TROUBLESHOOTING

*When the troubleshooting is required, inspect separately such main parts as the control box, motor, operation panel box, motor, operation panel box, synchronizer, power switch, machine solenoid and presser foot lifter.
*When the control box is found to be out of order, inspect the control circuit board, power board, treadle unit, and transformer separately.
*Whatever troubles you encounter, check whether the connectors are secured.
***Pay great attention to the maintenance of the power and control circuit boards because the high voltage is applied.**
*Refer to the circuit drawings provided separately to check the quality of the detailed parts (semiconductors) for maintenance.

Trouble	Check Point	Parts to Be Replaced	Ref. Page
1. The machine does not run even by stepping on the treadle while the power switch is ON.	Check the power source voltage. (Try to plug into another outlet.)		
(1) Power indicator lamp (red LED) does not go ON.	Fuse blown: 3-phase 5 A fuse (2 pcs.) Single-phase 15 A fuse (1 pc.) (Replace with new ones.)	Fuse Control box	
(2) Power indicator lamp (red LED) is ON.	Check whether the connectors are secured. (Check especially the 6P connector of the motor.)	Control box	
2. The machine stops during operation. (1) Power indicator lamp (red LED) flickers.	The machine pulley is so heavy to turn manually. [The machine or the motor (brake lining) is locked. Remove the trouble cause and turn on the power. Then the machine runs normally.)		
(2) Power indicator lamp (red LED) does not flickers.	Power source voltage drop. (The motor is not out of order.)		
3. The machine starts running just by turning on the power switch even with the treadle set in the neutral position.		Control box	
4. The machine does not run at high speed.	Check whether the high speed volume is not set at "Low." (The setting range of the high speed volume is from 230 spm to the maximum.)	Power switch assembly Control box	
5. The machine does not stop even if the treadle is returned to the neutral position.	If the machine stops after turning off the power switch, removing the synchronizer switch, then turning it on again, the synchronizer is out of order. (Use as a clutch motor for a while.)	Synchronizer Control box	
6. Abnormal motor running (variation in rpm)		Motor	P 25
7. The brake produces abnormal noises during operation.	Adjustment of brake clearance	Remove washer.	P 11
8. The operations related to the machine solenoid do not work. (thread trimming, reverse rotation, thread wiper, and presser)	Check the 8 A fuse provided on the control circuit board.	8 A fuse Control box	
9. Abnormality related to automatic backtacking, etc.		Control box Operation box	P 26
10. The machine does not make proper hem stop, using the sensor.	If the thickness cannot be monitored with the [ply sensor] LED, or the monitoring is unstable, adjust by pressing the [ply sensor] key again.		
	If the [ply sensor] LED does not go on even after the adjustment above, check the connector for the sensor.		

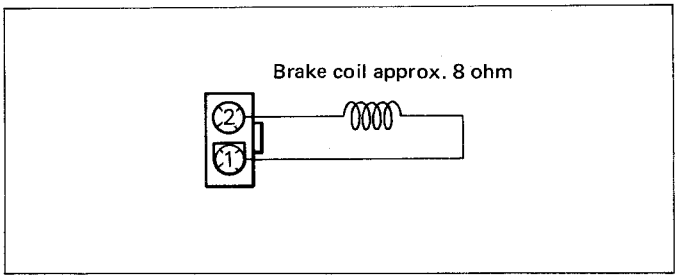
CHECKING THE MOTOR

1 Motor



1. Remove the motor code (6P connector) from the connector part of the control box.
2. Measure with the tester set in the resistance range as follows.
   - If the tester reads approx. 2-3 ohm at any position between 4 (red) and 6 (black) with the resistance range x1, it is normal. It should read approx. 2-3 ohm at each position while turning the motor pulley slowly. If it reads approx. 10 ohm or more at some positions, it is out of order. However, if the pointer swings to much extent while turning the motor pulley, be sure to measure after stopping the pulley.
   - If the tester reads approx. 5 K-40 Kohm when measured at any position between 3 (black) and 6 (black) with the resistance range x1, it is normal.
   - If the tester reads approx. 5 K-40 Kohm when measured at any position between 1 (yellow) and 2 (yellow) with the resistance range x1, it is normal.

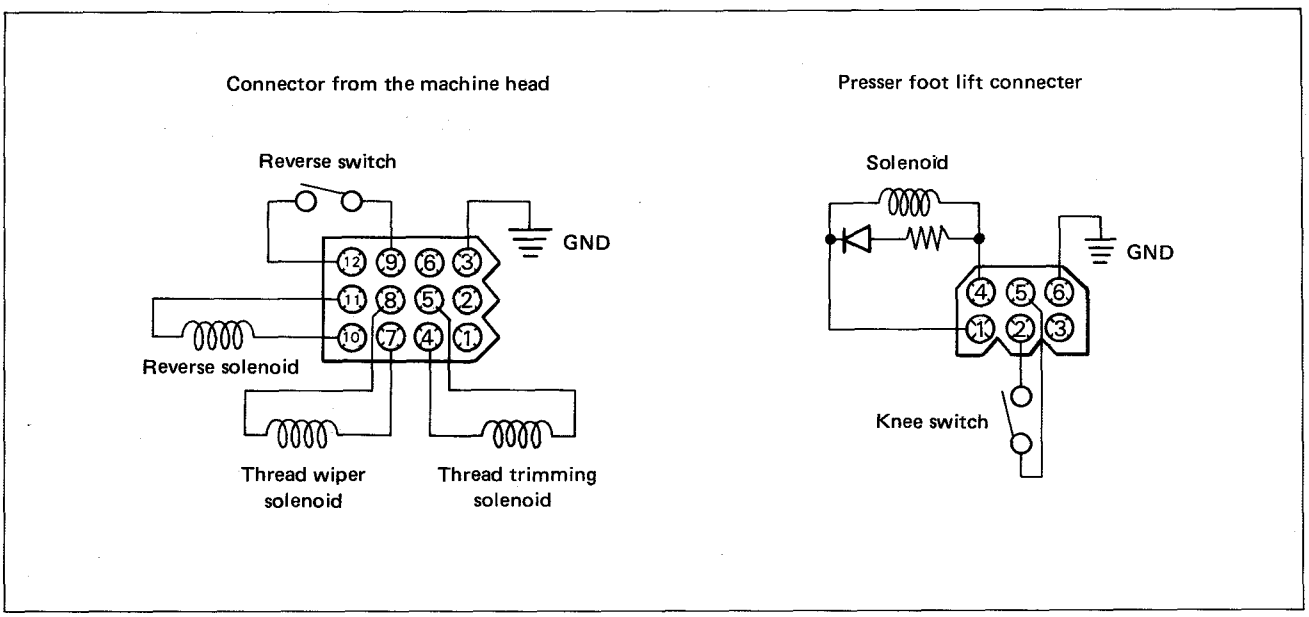
2 Brake



1. Remove the brake code (2P connector) from the connector part of the control box.
2. Measure with the tester set in the resistance range as follows.
   - If the tester reads approx. 7-9 ohm when measured at any position between 1 (black) and 2 (black) with the resistance range x1, it is normal.

CHECKING THE MACHINE SOLENOIDS

1 Solenoid load of the machine



1. Remove the load connector (12P connector) of the machine from the connector part of the control box.
2. Measure with the tester set in the resistance range x1 as follows.

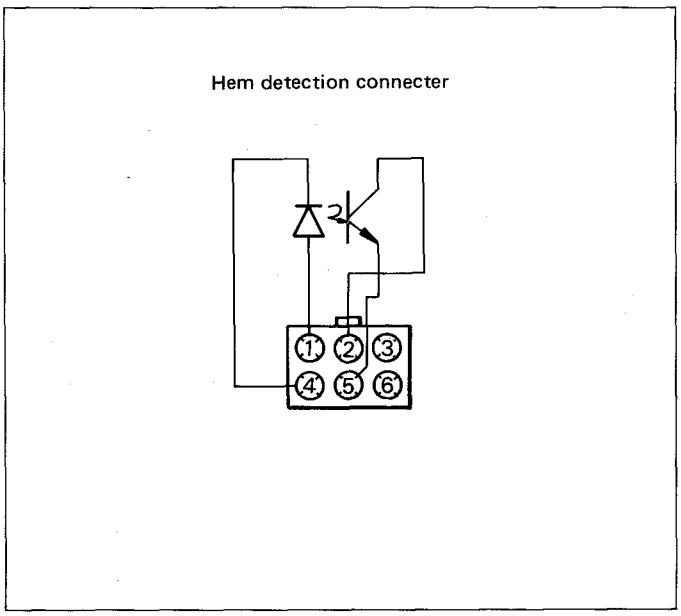
〈Machine Head〉

- The thread trimming solenoid provided between 4 and 5 is normal if the tester reads approx. 7 ohm.
- The thread wiper solenoid provided between 7 and 8 is normal if the tester reads approx. 5 ohm.
- The actuator provided between 9 and 12 is normal if the tester reads 0 ohm when pressed, and ∞ ohm when released.

〈Presser Lift〉

- The presser lift solenoid provided between 1 and 4 is normal if the tester reads approx. 5 ohm.
- The presser lift switch provided between 2-5 is normal if the tester reads 0 ohm when pressed, and ∞ ohm when released.

2 Hem sensor

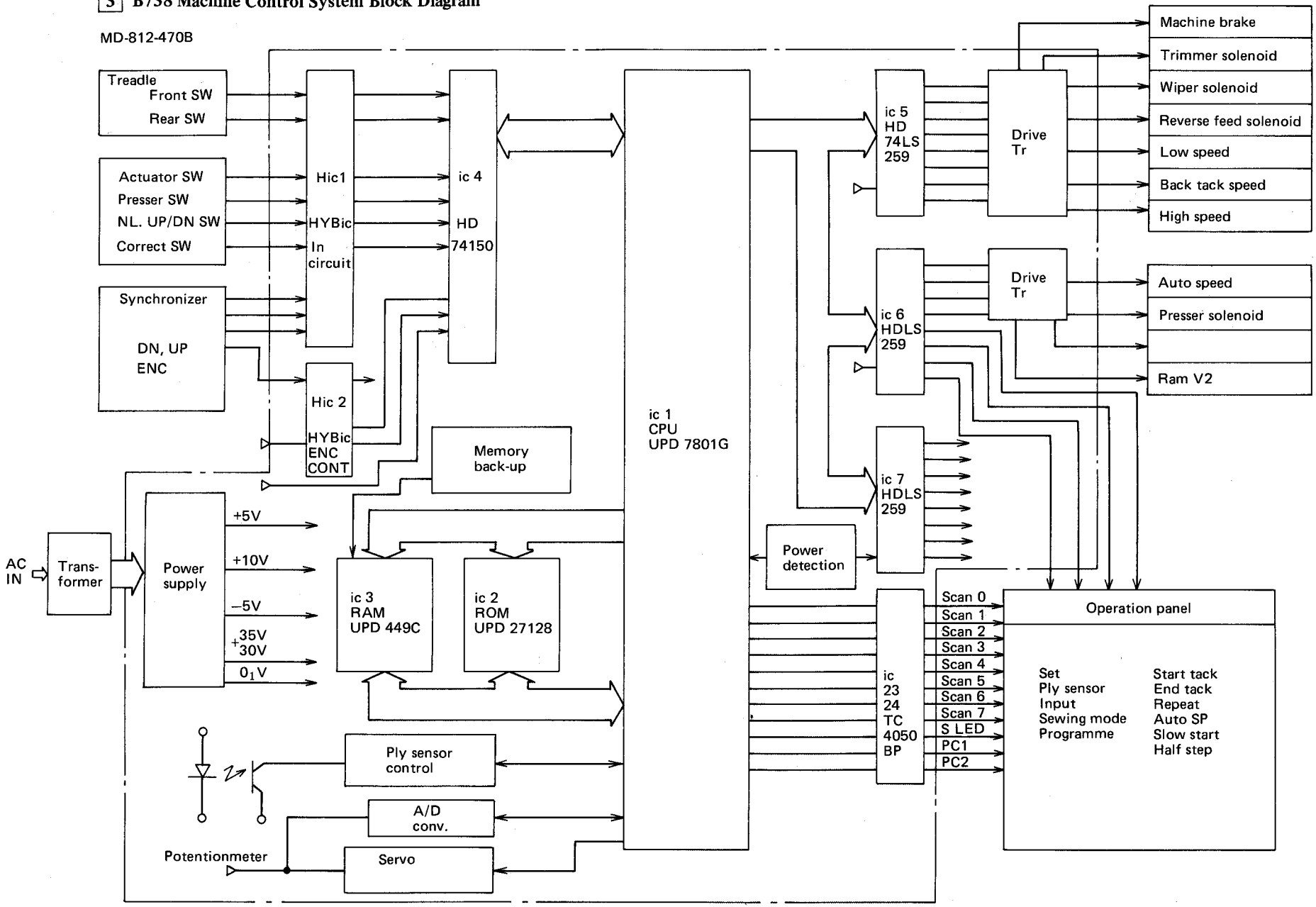


1. Remove the sensor cord (6P connector) from the connector part of the control box.
2. Measure with the tester set in the resistance range as follows.
   - If the tester, with the x1 range, reads approx. 30-50 ohm at any position between 1 [tester (–) side] and 4 [tester (+) side], and ∞ at any position between 1 [tester (+) side] and 4 [tester (–) side], they are normal.
   - If the tester, with the x1 range, reads approx. 30 K-50 Kohm at any position between 2 [tester (–) side] and 5 [tester (+) side], and ∞ at any position between 2 [tester (+) side] and 5 [tester (–) side], they are normal.

   *The resistance value might not always be in the range mentioned above because it varies according to the brightness.

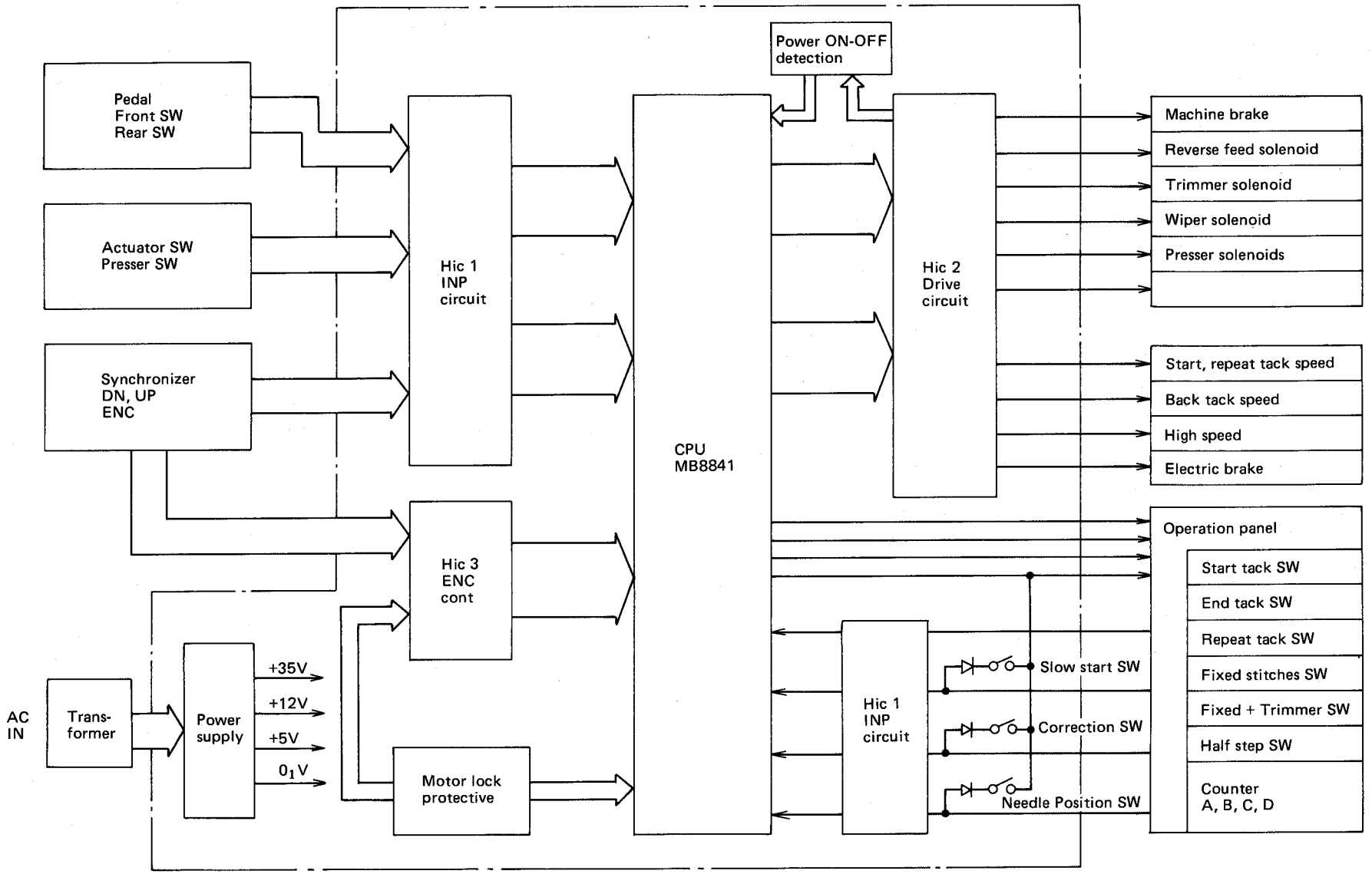
3 B738 Machine Control System Block Diagram

MD-812-470B

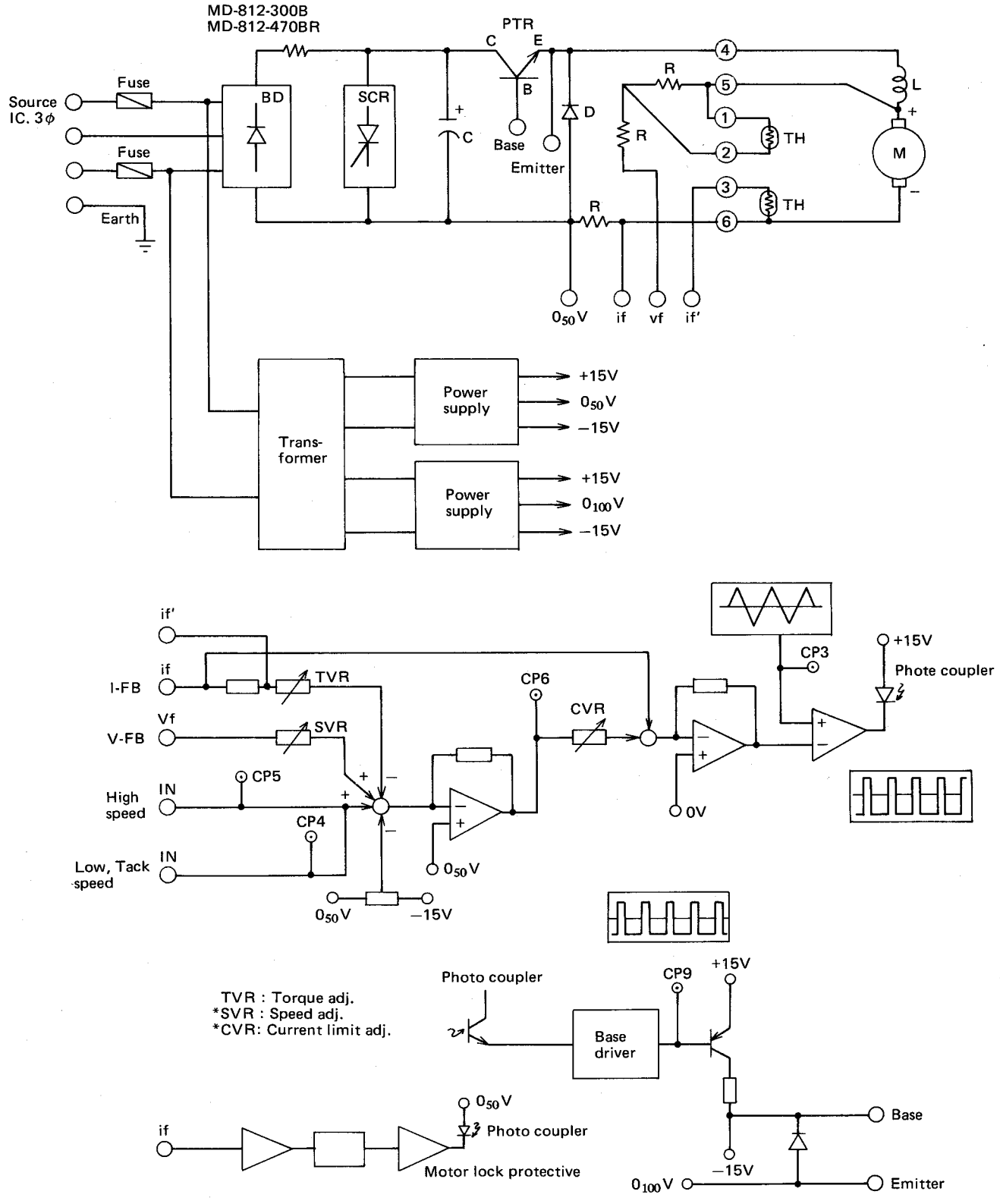


4 B737 Machine Control System Block Diagram

MD-812-300B



5 B737· B738 Motor Drive Control System Block Diagram



NOTE: Never touch the volumes indicated with an astarisk (*).

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